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ORIGINAL

Two-Dimensional Wind Tunnel Test of an Oscillating Rotor Airfoil

Volume II

L. U. Dadone

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Two-Dimensional Wind Tunnel Test of an Oscillating Rotor Airfoil

Volume II

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Philadelphia, Pennsylvania

Prepared for
Langley Research Center
under Contract NAS1-13795

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TWO-DIMENSIONAL WIND TUNNEL TEST
OF AN OSCILLATING ROTOR AIRFOIL
DATA REPORT

(Volume II)

by

L. U. Dadone
Boeing Vertol Company

SUMMARY

An experimental investigation was conducted to determine the quasi-steady and unsteady characteristics of the NLR 7223-62 airfoil, an advanced section designed for helicopter rotor applications. The data were obtained with an airfoil model equipped with 17 differential transducers and mounted in the variable density test section of a blow-down wind tunnel. The test equipment and procedures were similar to other oscillating airfoil tests previously conducted in the same facility.

Quasi-steady pressure data were acquired at Mach numbers between M = 0.2 and 0.9 with porous floor and ceiling (4.9% porosity). Drag data were acquired at a limited number of conditions with a wake-traversing probe. Static and oscillatory tests were then run with solid floor and ceiling at Mach numbers between M = 0.2 and M = 0.7.

The oscillatory test was run at frequencies from 23 Hz to approximately 90 Hz, with amplitudes of oscillation ranging from 2.5° to 10.0°. The test results are presented in two volumes. The first volume documents the test procedure and discusses some of the key results. The second volume is a data report and it contains tabulations of all static and oscillatory data.

LIST OF SYMBOLS

Computer Listing	Text	Description
AERO DAMP		symbol for $\left[2\pi^2 f_D(\Delta\alpha)^2\right]^{-1} \oint C_m d\alpha$, work-per-cycle coefficient
ALPHA	α	airfoil angle of attack, deg
ALPHA·NMAX		airfoil angle of attack at maximum value of normal force during a cycle of oscillation, deg

Computer Listing	Text	Description
ALPHA·0	α_o	mean angle of attack during oscillation cycle, deg
	c	airfoil chord, m
	C_d	airfoil drag coefficient (drag force/unit span)/$q_\infty c$
CM	C_m	airfoil pitching-moment coefficient, (pitching moment/unit span)/$q_\infty c^2$
CM(MIN)		maximum magnitude of pitching-moment coefficient attained during oscillation
CN	C_n	airfoil normal force coefficient, (normal force/unit span)/$q_\infty c$
CN(MAX)		maximum magnitude of normal-force coefficient attained during oscillation
DCP	ΔC_p	differential pressure coefficient, $\Delta P/q_\infty$
DEL·ALPHA	$\Delta\alpha$	amplitude of pitching motion, deg
DRIVE HZ	f_D	drive frequency of airfoil motion in pitch, Hertz
K	k	reduced frequency, $\pi fc/V$
MACH NO.	M	Mach number
n PHI		computer symbol for phase lead of response with respect to forcing motion for the nth harmonic, deg
	P_T	tunnel test section total pressure, N/m^2 (lb/in^2)
Q	q	dynamic pressure, defined as $\frac{1}{2}\rho V^2$, N/m^2 (lb/ft^2)
RES n		magnitude of resultant for the nth harmonic
RN	R_n	Reynolds number based on airfoil chord

Computer Listing	Text	Description
TDR		ratio of the work-per-cycle coefficient to the theoretical value
TP		test point identification
V		tunnel velocity, m/sec (ft/sec)
X/C	x/c	chordwise position, measured from the leading edge as a fraction of the chord

SUMMARY OF TEST CONDITIONS

QUASI-STEADY FLOW CONDITIONS

1. Floor and Ceiling with 4.9% Porosity

1.1 Pressures and Integrated Data

Mach No.	Rn x 10^{-6}	Page No.
0.2	1.55	11
0.2	3.2	13
0.3	4.8	15
0.4	6.3	17
0.5	7.9	19
0.6	3.2	21
0.6	6.3	24
0.6	9.4	27
0.7	10.0	32
0.75	10.0	37
0.8	10.5	39
0.85	11.0	42
0.9	3.6	44
0.9	7.2	45
0.9	11.0	46

1.2 Drag Data - See Table II 47

2. Solid Floor and Ceiling

Pressures and Integrated Data

Mach No.	$Rn \times 10^{-6}$	Page No.
0.2	3.2	48
0.3	4.8	50
0.4	2.3	53
	4.7	56
	6.3	59
	7.0	62
0.5	7.9	65
0.6	3.1	68
	6.2	70
	9.1	72
0.7	10.0	75

FORCED PITCH OSCILLATION FOR THE NLR 7223-62 AIRFOIL

Δα (DEG)	f_D (HZ)	M	α_0 (DEG) 0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	Rn $\times 10^{-6}$	k
			PAGE NUMBER OF COMPUTER DATA										
2.5	23	0.2	78	78	79	79	80	80	81	81	82	3.2	0.17
	23	0.3	82	83	83	84	84	85	85	86	86	4.8	0.12
	46		87	87	88	88	89	89	90	90	91	4.8	0.23
	69		91	92	92	93	93	94	94	95	95	4.8	0.34
	23	0.4	96	96	97	97	98	98	99	99	100	6.4	0.09
	46		100	101	101	102	102	103	103	104	104	6.4	0.18
	69		105	105	106	106	107	107	108	108	109	6.4	0.26
	23	0.5	109	110	110	111	111	112	112	113	-	7.9	0.07
	46		113	114	114	115	115	116	116	117	-	7.9	0.14
	69		117	118	118	119	119	120	120	121	-	8.0	0.22
	23	0.6	121	122	122	123	123	124	124	-	-	9.5	0.06
	46		125	125	126	126	127	127	128	-	-	9.5	0.12
	69		128	129	129	130	130	131	131	-	-	9.5	0.18
	23	0.7	132	132	133	133	134	134	-	-	-	10.0	0.05
	46		-	135	-	135	136	136	-	-	-	10.0	0.11
	69		137	137	138	138	139	-	-	-	-	10.0	0.16

FORCED PITCH OSCILLATION FOR THE NLR 7223-62 AIRFOIL

$\Delta\alpha$ (DEG)	f_D (HZ)	M	α_0 (DEG)									Rn $\times 10^{-6}$	k
			0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0		
			PAGE NUMBER OF COMPUTER DATA										
5.0	23	0.2	139	140	140	141	141	142	142	143	143	3.2	0.175
	46		144	144	145	145	146	146	147	147	148	3.2	0.35
	69		148	149	149	150	150	151	151	152	152	3.2	0.51
	23	0.3	153	153	154	154	155	155	156	156	157	4.8	0.12
	46		157	158	158	159	159	160	160	161	161	4.8	0.23
	69		162	162	163	163	164	164	165	165	166	4.8	0.35
	23	0.4	166	167	167	168	168	169	169	170	170	2.4	0.09
			171	171	172	172	173	173	174	174	175	4.7	
			175	176	176	177	177	178	178	179	179	6.4	
			180	180	181	181	182	182	183	183	184	7.0	
	46		184	185	185	186	186	187	187	188	188	6.4	0.17
	50		-	-	189	189	190	190	191	-	-	6.4	0.19
	52		-	-	191	192	192	193	193	-	-	6.4	0.192
	53		-	-	194	194	195	195	196	-	-	6.4	0.195
	54		-	-	196	197	197	198	198	-	-	6.4	0.20
	69		199	199	200	200	201	201	202	202	203	6.4	0.26

FORCED PITCH OSCILLATION FOR THE NLR 7223-62 AIRFOIL

			$\alpha_\circ$ (DEG)									Rn	
$\Delta\alpha$ (DEG)	f_D (HZ)	M	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	$\times 10^{-6}$	k
			PAGE NUMBER OF COMPUTER DATA										
5.0	38	0.4	203	204	204	205	205	206	206	-	-	2.4	0.34
	23	0.5	207	207	208	208	209	209	-	210	210	7.9	0.07
			-	-	-	-	211	211	212	-	-	8.0	0.07
	46		213	213	214	214	215	215	216	216	217	8.0	0.14
	69		217	218	218	219	219	220	-	220	-	8.2	0.20
			221	221	-	-	-	-	-	-	-	8.2	0.20
	23	0.6	222	222	223	223	224	-	-	-	-	9.3	0.06
			-	-	-	-	224	225	225	226	-	9.2	0.06
			226	227	227	228	228	229	229	230	-	6.2	0.06
			-	230	-	231	231	232	232	-	-	3.1	0.06
	46		-	-	-	-	-	233	234	234	-	9.2	0.12
			-	-	-	-	235	-	-	-	-	9.3	0.12
	69		235	236	236	237	237	238	238	-	-	9.2	0.18
	23	0.7	239	239	240	240	241	241	-	-	-	10.0	0.05

FORCED PITCH OSCILLATION FOR THE NLR 7223-62 AIRFOIL

$\Delta\alpha$ (DEG)	f_D (HZ)	M	α_0 (DEG)									Rn $\times 10^{-6}$	k
			0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0		
			PAGE NUMBER OF COMPUTER DATA										
7.5	23	0.2	-	242	242	243	243	244	-	-	-	3.2	0.17
		0.3	244	245	245	246	246	247	-	-	-	4.8	0.116
		0.4	247	248	248	249	249	-	-	-	-	6.4	0.09
	46		250	250	251	251	252	-	-	-	-	6.4	0.17
	23	0.5	252	253	253	254	-	-	-	-	-	8.0	0.07
	46		254	255	255	256	-	-	-	-	-	8.0	0.14
	23	0.6	256	257	257	-	-	-	-	-	-	9.4	0.06
		0.7	258	258	259	-	-	-	-	-	-	9.4	0.057

FORCED PITCH OSCILLATION FOR THE NLR 7223-62 AIRFOIL

			α_0 (DEG)									Rn	
$\Delta\alpha$ (DEG)	f (HZ)	M	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	$x10^{-6}$	k
			PAGE NUMBER OF COMPUTER DATA										
10.0	23	0.2	259	260	260	261	261	-	-	-	-	3.2	0.17
		0.3	262	-	262	263	263	-	-	-	-	4.8	0.115
		0.4	264	264	265	265	266	-	-	-	-	6.4	0.086
	46		266	267	267	268	-	-	-	-	-	6.4	0.17
	69		268	269	269	270	-	-	-	-	-	6.4	0.27
	23	0.5	270	271	271	272	-	-	-	-	-	7.9	0.07
		0.6	272	273	273	-	-	-	-	-	-	9.3	0.06
		0.7	274	274	275	-	-	-	-	-	-	10.0	0.052
5.0	40	0.2	-	-	-	-	-	276[1]	276	277[2]	-	3.3	0.29
7.5			-	-	-	-	-	277[1]	278	278[2]	-		
10.0			-	-	-	-	-	279[1]	279	280[2]	-		

NOTES:

[1] $\alpha_0 = 14°$

[2] $\alpha_0 = 16°$

TABLE I. SUMMARY OF MODEL CHARACTERISTICS

Airfoil Section	NLR 7223-62 (or NLR-1)
Model Span	0.3048m (12 inches, nominal)
Model Scale	1/4.23, based on a 0.686m (2.25 ft) full-scale blade chord
Model Chord	0.162m (6.38 in.)
Thickness Ratio	8.6 percent
Construction	Machined from Maraging Steel
Transducers:	
Type	Kulite Model No. 63-11967, Differential
Number Installed	17
Location in Percent Chord	1.01, 1.99, 3.0, 4.91, 7.37, 9.91, 14.93, 19.99, 24.97, 29.98, 39.91, 50.07, 60.05, 70.09, 80.02, 89.96, 96.91
Pressure Range	± 5.17×10^5 N/m^2 (± 75 psi) from 1 to 5 percent chord ± 3.45×10^5 N/m^2 (± 50 psi) from 7.5 to 97 percent chord
Minimum Natural Frequency as Installed	2,800 Hz

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.199 Rn = 1.55 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		-8.277	-7.662	-6.855	-6.305	-5.909	-4.419	-3.876	-3.512	-2.944	-2.107	-1.462
CN		-0.486	-0.414	-0.404	-0.378	-0.369	-0.230	-0.209	-0.132	-0.120	-0.073	-0.003
CM		-0.033	-0.057	-0.041	-0.041	-0.027	-0.034	-0.022	-0.029	-0.014	-0.021	-0.015
DCP 1	.010	-2.620	-2.834	-2.939	-3.390	-4.899	-3.941	-3.263	-2.666	-2.430	-2.515	-1.809
DCP 2	.020	-2.108	-2.170	-2.393	-2.765	-2.694	-1.981	-1.908	-1.467	-1.393	-1.250	-1.046
DCP 3	.030	-1.826	-1.991	-2.096	-2.223	-2.324	-1.496	-1.422	-1.176	-1.081	-0.706	-0.581
DCP 4	.049	-2.050	-2.007	-2.231	-2.275	-1.630	-1.221	-1.161	-0.963	-0.695	-0.741	-0.394
DCP 5	.074	-1.920	-1.815	-1.820	-1.806	-1.365	-0.842	-0.764	-0.670	-0.381	-0.310	-0.179
DCP 6	.099	-1.475	-1.701	-1.237	-1.184	-0.725	-0.455	-0.363	-0.281	-0.234	-0.017	0.252
DCP 7	.149	-1.254	-1.291	-1.057	-0.936	-0.611	-0.473	-0.506	-0.313	-0.203	-0.161	-0.179
DCP 8	.200	-1.019	-0.648	-0.625	-0.418	-0.571	-0.397	-0.044	-0.086	-0.079	-0.062	0.291
DCP 9	.250	-0.644	-0.642	-0.393	-0.357	-0.434	-0.320	-0.204	-0.112	-0.150	0.025	0.089
DCP10	.300	-0.617	-0.499	-0.385	-0.247	-0.173	-0.240	-0.180	-0.169	-0.118	-0.060	-0.081
DCP11	.399	-0.393	-0.280	-0.316	-0.228	-0.340	-0.147	-0.138	0.022	0.020	-0.039	0.062
DCP12	.501	-0.142	-0.135	-0.156	-0.190	-0.111	-0.033	-0.004	0.017	0.068	-0.007	0.112
DCP13	.600	-0.257	-0.029	-0.054	0.002	-0.114	0.026	-0.163	-0.028	-0.064	0.101	0.147
DCP14	.701	0.100	0.116	0.051	0.094	0.022	0.085	0.037	0.018	0.021	0.169	0.090
DCP15	.800	0.135	0.166	0.109	0.063	0.139	0.072	0.082	0.179	0.117	0.045	0.142
DCP16	.900	-0.103	0.046	-0.061	-0.044	-0.168	0.019	-0.025	-0.026	-0.087	-0.097	-0.127
DCP17	.969	-0.131	-0.052	-0.079	-0.192	-0.221	-0.166	-0.119	-0.096	-0.214	-0.086	-0.223

DATA TYPE	X/C											
ALPHA		-0.464	0.100	1.007	1.370	1.979	4.010	4.336	4.883	5.613	6.390	6.850
CN		0.095	0.131	0.216	0.255	0.297	0.474	0.508	0.552	0.635	0.688	0.749
CM		-0.015	-0.027	-0.018	-0.013	-0.016	-0.006	-0.006	-0.012	-0.015	-0.008	-0.022
DCP 1	.010	-1.138	-1.062	-0.789	-0.184	0.128	1.436	1.760	1.914	1.926	2.459	2.095
DCP 2	.020	-0.455	-0.265	0.004	0.197	0.589	1.328	1.707	1.901	2.226	2.397	2.722
DCP 3	.030	-0.119	-0.111	0.349	0.589	0.719	1.529	1.855	1.877	2.125	2.509	2.616
DCP 4	.049	-0.109	0.087	0.094	0.473	0.679	1.262	1.525	1.600	1.655	1.954	2.174
DCP 5	.074	0.092	0.236	0.453	0.480	0.554	1.263	1.341	1.490	1.651	1.944	1.960
DCP 6	.099	0.287	0.363	0.687	0.830	0.840	1.446	1.459	1.440	1.636	1.825	2.016
DCP 7	.149	0.117	0.241	0.283	0.357	0.573	0.788	0.939	1.070	1.065	1.139	1.327
DCP 8	.200	0.156	0.203	0.560	0.564	0.390	0.926	0.710	0.887	1.191	1.250	1.117
DCP 9	.250	0.180	0.190	0.309	0.353	0.470	0.716	0.820	0.634	0.786	0.885	0.972
DCP10	.300	0.166	0.183	0.227	0.364	0.399	0.485	0.566	0.637	0.759	0.816	0.853
DCP11	.399	0.267	0.112	0.301	0.285	0.318	0.505	0.433	0.492	0.744	0.705	0.653
DCP12	.501	0.183	0.151	0.323	0.305	0.348	0.436	0.441	0.483	0.516	0.558	0.599
DCP13	.600	0.139	0.117	0.216	0.233	0.290	0.279	0.249	0.368	0.429	0.374	0.604
DCP14	.701	0.167	0.248	0.262	0.233	0.149	0.217	0.363	0.301	0.356	0.423	0.415
DCP15	.800	0.114	0.172	0.142	0.151	0.183	0.209	0.230	0.262	0.259	0.233	0.205
DCP16	.900	-0.079	-0.077	-0.097	-0.157	-0.137	-0.022	-0.113	0.002	-0.042	-0.029	0.080
DCP17	.969	-0.276		-0.239	-0.122	-0.040	-0.202	-0.105	-0.181	-0.179	-0.205	-0.062

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

$M = 0.199$ $Rn = 1.55 \times 10^6$

DATA TYPE	X/C											
ALPHA		7.412	7.937	9.614	11.093	11.440	13.422	14.622	15.093	16.008	16.297	16.556
CN		0.744	0.840	0.989	1.042	1.097	1.137	1.175	1.145	0.934	0.922	0.916
CM		-0.003	-0.005	-0.009	0.001	0.006	0.014	0.005	-0.055	-0.079	-0.090	-0.084
DCP 1	.010	3.048	3.072	4.316	5.656	5.796	5.719	6.243	1.411	1.127	0.372	1.298
DCP 2	.020	2.986	3.475	3.630	4.089	4.444	4.804	4.821	2.665	1.603	1.540	1.642
DCP 3	.030	2.864	2.979	3.726	4.052	4.443	4.741	4.468	2.538	1.823	1.755	1.647
DCP 4	.049	2.364	2.545	3.122	3.260	3.676	3.668	4.016	3.746	3.020	3.081	3.042
DCP 5	.074	2.038	2.347	2.761	2.964	3.145	3.395	3.371	3.143	2.531	2.405	2.360
DCP 6	.099	1.921	2.229	2.617	2.728	2.904	3.029	3.025	2.691	2.174	2.146	1.962
DCP 7	.149	1.404	1.619	1.834	1.920	2.023	2.140	2.173	1.837	1.234	1.332	1.502
DCP 8	.200	1.223	1.386	1.458	1.773	1.743	1.874	1.794	2.101	1.301	1.233	1.256
DCP 9	.250	0.987	1.121	1.322	1.379	1.420	1.568	1.503	1.616	1.211	1.117	0.991
DCP10	.300	0.811	0.908	1.138	1.164	1.209	1.287	1.358	1.418	1.104	0.962	0.991
DCP11	.399	0.658	0.903	0.879	0.914	1.026	1.035	1.115	1.296	1.031	0.897	0.968
DCP12	.501	0.613	0.660	0.780	0.765	0.839	0.815	0.892	1.044	0.867	0.898	0.879
DCP13	.600	0.463	0.409	0.656	0.584	0.521	0.547	0.654	0.739	0.670	0.811	0.644
DCP14	.701	0.369	0.424	0.457	0.396	0.451	0.477	0.384	0.567	0.626	0.676	0.686
DCP15	.800	0.250	0.265	0.291	0.265	0.288	0.238	0.321	0.434	0.568	0.577	0.608
DCP16	.900	-0.049	-0.066	0.007	0.066	-0.007	0.012	0.058	0.221	0.291	0.335	0.239
DCP17	.969	-0.134	-0.063	-0.104	-0.059	-0.051	-0.138	-0.118	-0.152	-0.063	-0.061	0.035

DATA TYPE	X/C		
ALPHA		18.726	19.851
CN		0.965	0.939
CM		-0.096	-0.061
DCP 1	.010	0.254	1.566
DCP 2	.020	1.458	1.703
DCP 3	.030	1.734	1.663
DCP 4	.049	3.195	2.723
DCP 5	.074	2.474	2.769
DCP 6	.099	2.174	2.640
DCP 7	.149	1.447	1.668
DCP 8	.200	1.280	1.445
DCP 9	.250	1.098	1.046
DCP10	.300	0.959	0.964
DCP11	.399	1.111	0.996
DCP12	.501	1.007	0.841
DCP13	.600	0.729	0.671
DCP14	.701	0.770	0.564
DCP15	.800	0.621	0.503
DCP16	.900	0.237	0.203
DCP17	.969	0.015	-0.046

M = 0.2 $R_n = 3.2 \times 10^6$

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

DATA TYPE	X/C						
ALPHA		-10.1	-8.68	-7.24	-5.72	-4.36	-3.01
CN		-0.638	-0.579	-0.491	-0.407	-0.293	-0.159
CM		-0.024	-0.030	-0.039	-0.036	-0.034	-0.032
DCP 1	.010	-2.416	-2.314	-5.054	-4.706	-3.603	-2.555
DCP 2	.020	1.809	2.008	1.091	1.560	2.221	2.888
DCP 3	.030	-2.866	-2.188	-2.287	-2.307	-1.822	-1.300
DCP 4	.049	-2.040	-2.399	-2.101	-1.700	-1.303	-0.867
DCP 5	.074	-1.897	-2.009	-1.625	-1.312	-0.964	-0.589
DCP 6	.099	-1.645	-1.579	-1.207	-0.917	-0.633	-0.329
DCP 7	.149	-1.475	-1.282	-0.927	-0.704	-0.497	-0.255
DCP 8	.200	-1.334	-1.165	-0.745	-0.575	-0.403	-0.204
DCP 9	.250	-1.084	-1.035	-0.618	-0.478	-0.321	-0.170
DCP 10	.300	-0.828	-0.828	-0.464	-0.340	-0.216	-0.068
DCP 11	.399	-0.552	-0.507	-0.333	-0.254	-0.174	-0.052
DCP 12	.501	-0.398	-0.302	-0.284	-0.227	-0.161	-0.077
DCP 13	.600	-0.186	-0.092	-0.110	-0.092	-0.046	0.019
DCP 14	.701	-0.052	-0.0	-0.0	0.009	0.052	0.106
DCP 15	.800	-0.009	0.009	0.009	-0.0	0.018	-0.045
DCP 16	.900	-0.133	-0.113	-0.150	-0.160	-0.171	-0.153
DCP 17	.969	0.206	0.354	0.426	0.484	0.507	0.5306

DATA TYPE	X/C						
ALPHA		-1.643	-0.276	1.097	2.458	3.831	5.197
CN		-0.039	0.090	0.209	0.3348	0.468	0.597
CM		-.030	-0.029	-0.026	-0.024	-0.023	-0.020
DCP 1	.010	-1.645	-0.775	0.059	0.873	1.698	2.537
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	-0.776	-0.250	0.293	0.853	1.446	2.034
DCP 4	.049	-0.440	0.006	0.436	0.904	1.390	1.860
DCP 5	.074	-0.248	0.125	0.479	0.848	1.228	1.628
DCP 6	.099	-0.036	0.271	0.556	0.865	1.185	1.506
DCP 7	.149	-0.040	0.211	0.425	0.668	0.871	1.134
DCP 8	.200	-0.027	0.162	0.336	0.523	0.720	0.918
DCP 9	.250	-0.024	0.140	0.291	0.453	0.625	0.789
DCP 10	.300	0.061	0.199	0.340	0.460	0.612	0.749
DCP 11	.399	0.042	0.158	0.254	0.363	0.474	0.573
DCP 12	.501	0.0	0.096	0.167	0.239	0.330	0.412
DCP 13	.600	0.076	0.124	0.183	0.242	0.303	0.363
DCP 14	.701	0.142	0.189	0.226	0.274	0.322	0.360
DCP 15	.800	0.073	0.101	0.111	0.140	0.178	0.198
DCP 16	.900	-0.145	-0.137	-0.128	-0.119	-0.100	-0.090
DCP 17	.969	0.526	0.444	0.350	0.294	0.296	0.228

$M = 0.2 \quad R_n = 3.2 \times 10^6$

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

DATA TYPE	X/C						
ALPHA		6.564	7.920	9.291	10.65	12.185	13.53
CN		0.725	0.856	0.986	1.099	1.224	1.327
CM		-0.018	-0.015	-0.011	-0.008	-0.007	-
DCP 1	.010	3.348	4.271	5.266	5.860	6.056	6.599
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	2.568	3.166	3.753	4.304	4.928	5.471
DCP 4	.049	2.340	2.843	3.326	3.787	4.297	4.722
DCP 5	.074	2.005	2.395	2.780	3.148	3.560	3.896
DCP 6	.099	1.821	2.149	2.469	2.765	3.096	3.373
DCP 7	.149	1.382	1.640	1.876	2.090	2.351	2.556
DCP 8	.200	1.109	1.300	1.504	1.675	1.880	2.056
DCP 9	.250	0.946	1.113	1.273	1.430	1.608	1.743
DCP10	.300	0.879	1.018	1.143	1.264	1.405	1.522
DCP11	.399	0.695	0.797	0.899	0.999	1.112	1.193
DCP12	.501	0.503	0.578	0.662	0.735	0.820	0.887
DCP13	.600	0.414	0.475	0.527	0.577	0.629	0.662
DCP14	.701	0.399	0.438	0.477	0.497	0.536	0.547
DCP15	.800	0.218	0.238	0.258	0.268	0.288	0.299
DCP16	.900	-0.081	-0.071	-0.051	-0.051	-0.031	-0.020
DCP17	.969	0.209	0.230	0.221	0.181	0.040	-

ALPHA		14.85	16.19	17.53	18.88	20.14
CN		1.407	1.069	0.971	0.982	1.056
CM		0.002	-0.059	-0.070	-0.064	-0.079
DCP 1	.010	7.333	4.527	3.799	3.981	1.839
DCP 2	.020	-	-	-	-	-
DCP 3	.030	5.927	3.702	3.396	3.349	1.713
DCP 4	.049	5.038	3.326	2.794	2.639	3.729
DCP 5	.074	4.146	2.390	1.871	1.764	2.700
DCP 6	.099	3.557	1.783	1.402	1.486	2.052
DCP 7	.149	2.712	1.453	1.256	1.383	1.865
DCP 8	.200	2.192	1.284	1.122	1.244	1.275
DCP 9	.250	1.858	1.210	1.053	1.174	1.176
DCP10	.300	1.613	1.180	1.034	1.122	1.125
DCP11	.399	1.261	1.086	0.975	1.030	1.054
DCP12	.501	0.925	0.936	0.881	0.880	0.928
DCP13	.600	0.683	0.795	0.795	0.743	0.836
DCP14	.701	0.548	0.729	0.767	0.699	0.825
DCP15	.800	0.299	0.580	0.638	0.589	0.688
DCP16	.900	-0.020	0.267	0.288	0.277	0.319
DCP17	.969	-	-	-	-	-

M = 0.3 $R_n = 4.8 \times 10^6$

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

DATA TYPE	X/C						
ALPHA		-9.78	-8.46	-7.12	-5.73	-4.369	-3.00
CN		-0.665	-0.582	-0.553	-0.448	-0.323	-0.192
CM		-0.012	-0.031	-0.031	-0.030	-0.028	-0.026
DCP 1	.010	-2.083	-2.357	-5.189	-4.747	-3.795	-2.690
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	-1.910	-2.409	-2.867	-2.391	-1.886	-1.353
DCP 4	.049	-2.127	-2.427	-2.114	-1.729	-1.312	-0.880
DCP 5	.074	-1.968	-2.189	-1.611	-1.289	-0.938	-0.585
DCP 6	.099	-1.798	-1.885	-1.255	-0.979	-0.685	-0.381
DCP 7	.149	-1.625	-1.434	- .982	-0.765	-0.539	-0.300
DCP 8	.200	-1.176	-0.932	-0.813	-0.635	-0.454	-0.261
DCP 9	.250	-1.108	-0.912	-0.685	-0.536	-0.374	-0.211
DCP10	.300	-1.026	-0.738	-0.546	-0.420	-0.279	-0.137
DCP11	.399	-0.736	-0.446	-0.410	-0.314	-0.200	-0.094
DCP12	.501	-0.471	-0.293	-0.339	-0.268	-0.188	-0.104
DCP13	.600	-0.240	-0.156	-0.220	-0.173	-0.113	-0.049
DCP14	.701	-0.041	-0.008	-0.045	-0.011	0.034	0.080
DCP15	.800	-0.015	-0.008	-0.031	-0.023	0.0	0.023
DCP16	.900	-0.086	-0.082	-0.131	-0.144	-0.136	-0.129
DCP17	.969	-	-	-	-	-	-

ALPHA		-1.64	-0.24	1.14	2.50	3.88	6.62
CN		-0.059	0.075	0.204	0.341	0.480	0.742
CM		-0.024	-0.023	-0.022	-0.021	-0.020	-0.016
DCP 1	.010	-1.69	-0.779	0.087	0.946	1.797	3.461
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	-0.795	-0.247	0.324	0.914	1.512	2.640
DCP 4	.049	-0.427	0.039	0.506	0.986	1.484	2.447
DCP 5	.074	-0.2105	0.183	0.547	0.940	1.336	2.105
DCP 6	.099	-0.062	0.261	0.578	0.906	1.245	1.881
DCP 7	.149	-0.059	0.185	0.420	0.665	0.900	1.409
DCP 8	.200	-0.062	0.140	0.323	0.528	0.739	1.137
DCP 9	.250	-0.049	0.124	0.289	0.458	0.640	0.965
DCP10	.300	0.003	0.152	0.292	0.436	0.584	0.866
DCP11	.399	0.022	0.136	0.245	0.360	0.481	0.700
DCP12	.501	-0.015	0.075	0.158	0.249	0.341	0.511
DCP13	.600	0.016	0.078	0.144	0.211	0.283	0.405
DCP14	.701	0.123	0.174	0.221	0.273	0.321	0.413
DCP15	.800	0.051	0.079	0.103	0.135	0.168	0.217
DCP16	.900	-0.117	-0.113	-0.114	-0.097	-0.072	-0.055
DCP17	.969	-	-	-	-	-	-

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

M = 0.3 Rn = 4.8×10^6

DATA TYPE	X/C						
ALPHA		7.982	9.35	10.71	12.27	13.79	15.22
CN		0.878	1.006	1.124	1.244	1.266	1.106
CM		-0.014	-0.011	-0.009	-0.002	0.011	-0.050
DCP 1	.010	4.406	5.204	5.804	7.051	7.698	4.823
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	3.260	3.874	4.426	4.994	5.265	3.708
DCP 4	.049	2.936	3.419	3.889	4.331	4.483	3.487
DCP 5	.074	2.499	2.886	3.246	3.601	3.720	2.621
DCP 6	.099	2.203	2.521	2.823	3.115	3.204	2.049
DCP 7	.149	1.659	1.894	2.117	2.340	2.415	1.601
DCP 8	.200	1.334	1.528	1.721	1.905	1.963	1.414
DCP 9	.250	1.138	1.297	1.455	1.613	1.662	1.313
DCP10	.300	1.000	1.138	1.260	1.390	1.419	1.233
DCP11	.399	0.812	0.923	1.022	1.115	1.117	1.138
DCP12	.501	0.600	0.680	0.761	0.827	0.809	0.953
DCP13	.600	0.469	0.528	0.583	0.625	0.580	0.784
DCP14	.701	0.457	0.497	0.525	0.541	0.467	0.686
DCP15	.800	0.242	0.266	0.278	0.283	0.247	0.499
DCP16	.900	-0.043	-0.034	-0.021	-0.017	0.009	0.241
DCP17	.969	-	-	-	-	-	-

DATA TYPE	X/C				
ALPHA		16.66	18.15	19.65	20.19
CN		0.980	0.983	1.052	0.980
CM		-0.067	-0.065	-0.079	-0.070
DCP 1	.010	3.851	3.968	2.654	1.936
DCP 2	.020	-	-	-	-
DCP 3	.030	3.321	3.113	1.673	1.606
DCP 4	.049	2.764	2.561	3.272	3.238
DCP 5	.074	1.867	1.758	2.428	2.419
DCP 6	.099	1.459	1.520	1.973	1.967
DCP 7	.149	1.279	1.388	1.719	1.736
DCP 8	.200	1.172	1.286	1.499	1.286
DCP 9	.250	1.102	1.191	1.223	1.117
DCP10	.300	1.067	1.120	1.125	1.050
DCP11	.399	1.031	1.044	1.062	0.984
DCP12	.501	0.911	0.903	0.944	0.853
DCP13	.600	0.801	0.762	0.841	0.747
DCP14	.701	0.738	0.709	0.812	0.749
DCP15	.800	0.576	0.555	0.668	0.621
DCP16	.900	0.289	0.280	0.314	0.302
DCP17	.969	-	-	-	-

M = 0.4 $R_n = 6.3x16^6$

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

DATA TYPE	X/C						
ALPHA		-10.11	-8.48	-7.27	-4.20	-2.82	0.12
CN		-0.727	-0.598	-0.540	-0.336	-0.197	0.106
CM		0.003	-0.035	-0.035	-0.028	-0.026	-0.023
DCP 1	.010	-1.973	-2.450	-4.220	-4.002	-2.741	-0.591
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	-1.794	-3.081	-3.316	-1.918	-1.360	-0.106
DCP 4	.049	-2.318	-2.572	-2.347	-1.323	-0.862	0.169
DCP 5	.074	-2.087	-2.329	-1.691	-0.941	-0.561	0.309
DCP 6	.099	-1.824	-1.835	-1.346	-0.700	-0.575	0.346
DCP 7	.149	-1.510	-1.361	-1.029	-0.540	-0.293	0.257
DCP 8	.200	-1.163	-1.033	-0.762	-0.466	-0.266	0.176
DCP 9	.250	-1.148	-0.865	-0.687	-0.386	-0.215	0.167
DCP10	.300	-1.105	-0.698	-0.523	-0.295	-0.147	0.182
DCP11	.399	-0.886	-0.416	-0.411	-0.224	-0.106	0.153
DCP12	.501	-0.622	-0.303	-0.313	-0.187	-0.100	0.099
DCP13	.600	-0.359	-0.173	-0.185	-0.121	-0.056	0.092
DCP14	.701	-0.104	-0.006	-0.009	.029	0.077	0.186
DCP15	.800	-0.060	-0.002	-0.004	-0.011	0.011	0.079
DCP16	.900	-0.115	-0.080	-0.092	-0.148	-0.144	-0.121
DCP17	.969	-	-	-	-	-	-

DATA TYPE	X/C						
ALPHA		1.36	4.68	5.70	6.70	7.70	8.71
CN		0.235	0.578	0.683	0.783	0.884	0.985
CM		-0.021	-0.018	-0.017	-0.016	-0.013	-0.008
DCP 1	.010	0.215	2.313	2.968	3.642	4.481	5.731
DCP 2	.020	-	-	-	-	-	-
DCP 3	.030	0.438	1.951	2.420	2.837	3.295	3.720
DCP 4	.049	0.624	1.872	2.253	2.637	3.014	3.367
DCP 5	.074	0.659	1.664	1.964	2.266	2.562	2.846
DCP 6	.099	0.661	1.522	1.755	2.004	2.244	2.473
DCP 7	.149	0.503	1.107	1.298	1.490	1.668	1.841
DCP 8	.200	1.380	0.888	1.048	1.199	1.343	1.484
DCP 9	.250	1.334	1.759	1.894	1.016	1.138	1.255
DCP10	.300	0.316	0.682	0.794	0.901	1.004	1.101
DCP11	.399	1.263	0.559	0.645	0.728	0.810	0.886
DCP12	.501	0.183	0.411	0.482	0.544	0.605	0.664
DCP13	.600	0.154	0.323	0.378	0.428	0.473	0.514
DCP14	.701	0.236	0.359	0.394	0.425	0.455	0.477
DCP15	.800	0.105	0.178	0.201	0.222	0.238	0.249
DCP16	.900	-0.114	-0.082	-0.076	-0.066	-0.056	-0.051
DCP17	.969	-	-	-	-	-	-

$M = 0.4$

$R_n = 6.3x16^6$

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENTS
FLOOR AND CEILING WITH 4.9%
POROSITY

DATA TYPE	X/C					
ALPHA		9.70	10.71	11.68	12.86	16.48
CN		1.055	1.086	1.086	1.017	1.015
CM		-0.004	0.002	0.012	0.009	-0.046
DCP 1	.010	6.421	6.566	5.922	4.593	3.688
DCP 2	.020	-	-	-	-	-
DCP 3	.030	3.956	4.364	5.065	4.876	3.175
DCP 4	.049	3.606	3.722	4.079	3.361	2.677
DCP 5	.074	3.059	3.170	3.238	2.939	2.398
DCP 6	.099	2.652	2.743	2.741	2.642	2.179
DCP 7	.149	1.986	2.071	2.101	2.129	1.727
DCP 8	.200	1.604	1.684	1.711	1.681	1.461
DCP 9	.250	1.359	1.418	1.432	1.379	1.298
DCP10	.300	1.182	1.229	1.229	1.158	1.144
DCP11	.399	0.947	0.975	0.961	0.918	1.004
DCP12	.501	0.710	0.720	0.698	0.653	0.840
DCP13	.600	0.540	0.533	0.486	0.437	0.673
DCP14	.701	0.477	0.445	0.379	0.335	0.602
DCP15	.800	0.243	0.215	0.176	0.200	0.491
DCP16	.900	-0.049	-0.053	-0.037	0.024	0.229
DCP17	.969	-	-	-	-	-

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENT
FLOOR AND CEILING WITH 4.5% POROSITY

M = 0.5 Rn = 7.9 x 10^6

DATA TYPE	X/C										
ALPHA		-9.99	-8.99	-8.16	-6.82	-5.89	-5.00	-4.10	-3.06	-2.04	-1.07
CN		-0.695	-0.670	-0.611	-0.508	-0.459	-0.407	-0.319	-0.227	-0.119	-0.010
CM		-0.002	-0.022	-0.031	-0.035	-0.031	-0.027	-0.020	-0.018	-0.018	-0.017
DCP 1	.010	-2.231	-2.568	-2.530	-3.983	4.257	-	-3.863	-3.417	-2.659	-1.637
DCP 2	.020	-2.933	-3.485	-3.561	-3.220	3.252	-3.028	-2.715	-2.095	-1.590	-1.035
DCP 3	.030	-2.619	-2.957	-2.954	-2.992	2.775	-2.668	-1.989	-1.567	-1.130	-0.688
DCP 4	.049	-2.052	-2.075	-2.492	-2.405	2.210	-2.046	-1.306	-0.986	-0.618	-0.257
DCP 5	.074	-1.821	-2.050	-2.269	-1.810	1.585	-1.423	-0.903	-0.630	-0.324	-0.029
DCP 6	.099	-1.740	-1.846	-1.722	1.392	1.142	-0.986	-0.692	-0.457	-0.193	0.059
DCP 7	.149	-1.545	-1.553	-1.321	1.039	0.820	-0.666	-0.537	-0.358	-0.163	0.032
DCP 8	.200	-1.189	-1.168	-1.051	0.791	0.683	-0.571	-0.465	-0.315	-0.149	0.013
DCP 9	.250	-1.161	-1.222	-1.058	0.655	0.565	-0.476	-0.380	-0.252	-0.110	0.024
DCP10	.300	-1.031	-1.012	-0.836	0.513	0.451	-0.375	-0.294	-0.185	-0.064	0.052
DCP11	.399	-0.777	-0.623	-0.476	0.380	0.340	-0.289	-0.228	-0.144	-0.048	0.045
DCP12	.501	-0.510	-0.368	-0.305	0.270	0.247	-0.216	-0.175	-0.114	-0.040	0.032
DCP13	.600	-0.277	-0.205	-0.161	0.141	0.132	-0.120	-0.095	-0.051	0.004	0.059
DCP14	.701	-0.062	-0.009	0.013	0.132	0.034	0.038	0.052	0.081	0.121	0.160
DCP15	.800	-0.036	0.005	0.021	0.026	0.016	0.008	0.006	0.015	0.038	0.062
DCP16	.900	-0.084	-0.053	-0.036	-0.039	-0.060	-0.082	-0.101	-0.117	-0.115	-0.108
DCP17	.969	-0.037	-0.017	-0.003	-0.006	-0.010	-0.022	-0.028	-0.041	-0.048	0.053

ALPHA		-0.05	0.99	1.95	2.97	4.0	4.94	6.00	6.99	7.95	8.97
CN		0.104	0.220	0.326	0.439	0.551	0.659	0.768	0.875	0.955	0.994
CM		-0.017	-0.017	-0.017	-0.017	-0.016	-0.0151	-0.013	-0.009	-0.007	0.000
DCP 1	.010	-0.948	-0.240	0.426	0.977	1.623	2.349	3.152	4.294	4.304	4.307
DCP 2	.020	-0.456	0.114	0.638	1.185	1.739	2.278	2.827	3.813	4.606	4.609
DCP 3	.030	-0.220	0.265	0.708	1.191	1.680	2.160	2.651	2.810	4.317	4.668
DCP 4	.049	0.143	0.549	0.929	1.352	1.778	2.199	2.663	3.187	3.196	3.198
DCP 5	.074	0.304	0.645	0.947	1.285	1.627	1.965	2.313	2.636	2.575	3.715
DCP 6	.099	0.335	0.620	0.879	1.166	1.454	1.722	2.003	2.260	2.419	2.271
DCP 7	.149	0.247	0.463	0.655	0.868	1.078	1.276	1.475	1.660	1.802	1.845
DCP 8	.200	0.172	0.359	0.519	0.691	0.859	1.016	1.176	1.327	1.445	1.512
DCP 9	.250	0.175	0.325	0.461	0.606	0.746	0.878	1.014	1.138	1.246	1.310
DCP10	.300	0.177	0.304	0.418	0.542	0.659	0.770	0.881	0.983	1.076	1.131
DCP11	.399	0.147	0.248	0.339	0.436	0.533	0.622	0.708	0.791	0.863	0.900
DCP12	.501	0.111	0.189	0.260	0.336	0.409	0.480	0.547	0.611	0.666	0.686
DCP13	.600	0.118	0.178	0.232	0.367	0.346	0.398	0.450	0.495	0.535	0.535
DCP14	.701	0.203	0.246	0.284	0.326	0.365	0.400	0.433	0.459	0.481	0.452
DCP15	.800	0.085	0.110	0.133	0.158	0.181	0.201	0.217	0.230	0.239	0.207
DCP16	.900	-0.102	-0.095	-0.088	-0.080	-0.073	-0.066	-0.061	-0.058	-0.057	-0.070
DCP17	.969	0.058	-0.064	-0.068	-0.071	-0.075	-0.078	-0.083	-0.086	-0.089	-0.095

AIRFOIL NLR 7223-62
STEADY FORCES AND MOMENT
FLOOR AND CEILING WITH 4.5% POROSITY

$M = 0.5$ $Rn = 7.9 \times 10^6$

DATA TYPE	X/C										
ALPHA		10.11	10.42	10.59	10.77	11.10	11.77	12.12	12.28	12.45	12.60
CN		1.044	1.063	1.060	1.070	1.012	0.997	1.013	0.999	0.992	1.001
CM		0.004	0.004	0.001	0.002	-0.001	-0.004	-0.009	-0.021	-0.010	-0.031
DCP 1	.010	4.309	4.324	4.322	4.318	4.318	4.322	4.317	3.575	4.320	3.105
DCP 2	.020	4.612	4.628	4.626	4.622	4.622	4.626	4.460	3.373	4.388	3.167
DCP 3	.030	4.670	4.686	4.685	4.680	4.680	4.685	4.680	4.120	3.557	4.119
DCP 4	.049	3.200	3.211	3.210	3.207	2.99	3.060	3.108	2.965	3.106	2.760
DCP 5	.074	3.453	3.461	3.353	3.422	2.613	2.489	2.600	2.576	2.605	2.506
DCP 6	.099	2.539	2.596	2.527	2.582	2.364	2.150	2.254	2.316	2.284	2.271
DCP 7	.149	1.941	1.962	1.909	1.939	1.930	1.974	1.943	1.884	2.058	1.880
DCP 8	.200	1.838	1.903	1.844	1.892	1.830	1.752	1.709	1.626	1.745	1.627
DCP 9	.250	1.646	1.730	1.730	1.752	1.664	1.547	1.548	1.538	1.495	1.549
DCP10	.300	1.318	1.372	1.385	1.416	1.323	1.266	1.291	1.342	1.229	1.337
DCP11	.399	0.957	0.982	1.014	1.015	0.948	0.957	0.971	1.033	0.938	1.034
DCP12	.501	0.678	0.692	0.707	0.708	0.681	0.685	0.696	0.735	0.677	0.775
DCP13	.600	0.479	0.481	0.483	0.479	0.477	0.480	0.497	0.522	0.491	0.570
DCP14	.701	0.361	0.349	0.355	0.343	0.351	0.357	0.379	0.399	0.384	0.443
DCP15	.800	0.171	0.171	0.179	0.171	0.176	0.200	0.230	0.262	0.242	0.279
DCP16	.900	-0.015	-0.006	0.001	0.004	-0.004	0.010	0.033	0.039	0.026	0.057
DCP17	.969	-0.045	-0.046	-0.045	-0.036	-0.054	-0.036	-0.027	-0.037	-0.036	-0.023

ALPHA		13.11	13.97	15.02	16.07	17.07	18.05	18.987	20.18
CN		0.998	0.974	0.983	0.998	0.991	1.007	1.011	1.044
CM		-0.033	-0.042	-0.052	-0.061	-0.081	-0.089	-0.093	-0.0921
DCP 1	.010	3.300	2.956	2.921	2.492	2.043	1.944	1.844	2.929
DCP 2	.020	3.034	2.809	2.888	2.677	2.077	1.996	1.957	3.063
DCP 3	.030	3.688	3.503	3.311	2.953	2.368	2.196	2.194	2.424
DCP 4	.049	3.109	2.845	2.889	2.726	2.829	2.813	2.727	2.376
DCP 5	.074	2.529	2.316	2.243	2.229	2.370	2.397	2.373	2.076
DCP 6	.099	2.223	2.044	1.909	2.031	2.076	2.067	2.104	1.891
DCP 7	.149	1.891	1.795	1.755	1.866	1.833	1.815	1.805	1.710
DCP 8	.200	1.566	1.554	1.575	1.579	1.329	1.332	1.329	1.537
DCP 9	.250	1.481	1.464	1.448	1.415	1.259	1.264	1.257	1.385
DCP10	.300	1.293	1.271	1.268	1.282	1.162	1.164	1.170	1.320
DCP11	.399	1.041	1.017	1.040	1.057	1.047	1.074	1.067	1.160
DCP12	.501	0.779	0.784	0.797	0.862	0.900	0.958	0.952	0.981
DCP13	.600	0.569	0.614	0.628	0.675	0.754	0.807	0.822	0.820
DCP14	.701	0.441	0.486	0.530	0.571	0.667	0.713	0.734	0.702
DCP15	.800	0.308	0.315	0.387	0.402	0.511	0.530	0.560	0.538
DCP16	.900	0.071	0.087	0.125	0.138	0.196	0.202	0.218	0.223
DCP17	.969	-0.021	0.000	-0.003	0.001	0.010	0.015	0.026	0.042

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.592 Rn = 3.2×10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		-9.712	-9.191	-8.286	-7.882	-7.315	-6.832	-5.886	-5.435	-5.077	-4.225	-3.524
CN		-0.576	-0.591	-0.587	-0.558	-0.537	-0.495	-0.464	-0.423	-0.376	-0.317	-0.255
CM		0.016	0.008	-0.005	-0.014	-0.023	-0.034	-0.036	-0.042	-0.038	-0.030	-0.027
DCP 1	.010	-1.563	-1.505	-1.576	-1.546	-1.564	-1.585	-1.666	-1.634	-1.643	-1.745	-1.755
DCP 2	.020	-1.420	-1.437	-1.482	-1.480	-1.465	-1.488	-1.536	-1.558	-1.547	-1.614	-1.641
DCP 3	.030	-2.656	-2.776	-2.825	-2.762	-2.717	-2.735	-2.728	-2.695	-2.585	-2.496	-2.387
DCP 4	.049	-0.870	-0.946	-1.043	-1.035	-1.054	-1.082	-1.093	-1.143	-1.156	-1.197	-0.995
DCP 5	.074	-1.334	-1.545	-1.587	-1.604	-1.682	-1.639	-1.633	-1.665	-1.653	-1.451	-1.052
DCP 6	.099	-1.182	-1.393	-1.454	-1.492	-1.544	-1.573	-1.538	-1.539	-1.447	-1.126	-0.763
DCP 7	.149	-1.101	-1.233	-1.333	-1.299	-1.338	-1.319	-1.258	-1.320	-1.097	-0.608	-0.493
DCP 8	.200	-1.067	-1.164	-1.237	-1.251	-1.296	-1.199	-1.176	-1.018	-0.735	-0.545	-0.424
DCP 9	.250	-0.992	-1.086	-1.121	-1.087	-1.082	-1.044	-0.872	-0.750	-0.551	-0.421	-0.345
DCP10	.300	-0.853	-0.887	-0.867	-0.840	-0.785	-0.685	-0.638	-0.467	-0.418	-0.335	-0.276
DCP11	.395	-0.755	-0.595	-0.624	-0.558	-0.536	-0.452	-0.375	-0.290	-0.263	-0.233	-0.191
DCP12	.501	-0.498	-0.474	-0.452	-0.390	-0.330	-0.304	-0.231	-0.201	-0.175	-0.168	-0.157
DCP13	.600	-0.318	-0.295	-0.276	-0.251	-0.131	-0.111	-0.064	-0.064	-0.063	-0.070	-0.055
DCP14	.701	-0.095	-0.082	-0.023	0.010	0.024	0.083	0.082	0.121	0.110	0.103	0.115
DCP15	.800	-0.025	-0.098	-0.007	0.037	0.044	0.100	0.069	0.076	0.072	0.065	0.079
DCP16	.900	-0.170	-0.118	-0.058	-0.076	-0.049	-0.042	-0.041	-0.033	-0.066	-0.085	-0.094
DCP17	.969	-0.066	-0.049	-0.025	0.036	-0.012	0.037	0.001	0.026	0.026	-0.021	-0.011

DATA TYPE	X/C											
ALPHA		-3.035	-2.565	-1.671	-1.294	-0.823	-0.152	0.751	1.284	1.555	2.350	3.357
CN		-0.205	-0.136	-0.086	-0.023	0.045	0.106	0.166	0.235	0.295	0.363	0.434
CM		-0.024	-0.025	-0.017	-0.018	-0.020	-0.016	-0.015	-0.014	-0.013	-0.012	-0.013
DCP 1	.010	-1.737	-1.610	-1.342	-1.103	-0.815	-0.517	-0.285	-0.027	0.237	0.443	0.676
DCP 2	.020	-1.598	-1.434	-1.155	-0.801	-0.574	-0.360	-0.173	-0.002	0.237	0.440	0.634
DCP 3	.030	-2.285	-1.633	-1.062	-0.925	-0.616	-0.344	-0.024	0.264	0.558	0.837	1.165
DCP 4	.049	-0.683	-0.495	-0.392	-0.240	-0.116	0.021	0.165	0.345	0.492	0.635	0.817
DCP 5	.074	-0.718	-0.506	-0.311	-0.126	0.060	0.257	0.480	0.705	0.934	1.135	1.414
DCP 6	.099	-0.526	-0.391	-0.228	-0.034	0.141	0.285	0.472	0.685	0.855	1.043	1.287
DCP 7	.149	-0.403	-0.263	-0.156	-0.051	0.115	0.248	0.356	0.504	0.675	0.830	0.558
DCP 8	.200	-0.385	-0.257	-0.185	-0.064	0.001	0.163	0.278	0.391	0.441	0.596	0.708
DCP 9	.250	-0.270	-0.211	-0.102	-0.026	0.079	0.184	0.261	0.365	0.459	0.544	0.636
DCP10	.300	-0.202	-0.134	-0.073	0.013	0.073	0.175	0.253	0.315	0.397	0.478	0.545
DCP11	.399	-0.158	-0.071	-0.033	0.012	0.084	0.152	0.203	0.274	0.328	0.390	0.465
DCP12	.501	-0.136	-0.074	-0.020	0.025	0.065	0.107	0.158	0.207	0.235	0.294	0.336
DCP13	.600	-0.023	0.007	0.036	0.067	0.117	0.144	0.175	0.202	0.235	0.275	0.300
DCP14	.701	0.131	0.144	0.153	0.174	0.214	0.205	0.254	0.265	0.276	0.210	0.312
DCP15	.800	0.054	0.089	0.062	0.072	0.102	0.102	0.088	0.137	0.140	0.121	0.143
DCP16	.900	-0.084	-0.083	-0.131	-0.135	-0.107	-0.111	-0.110	-0.119	-0.142	-0.133	-0.092
DCP17	.969	-0.017	0.017	-0.021	-0.024	-0.022	-0.063	-0.058	-0.052	-0.036	-0.057	-0.046

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.592 Rn = 3.2 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		3.580	4.115	4.885	5.693	5.837	6.545	7.553	7.823	8.448	9.165	9.544
CN		0.495	0.545	0.600	0.684	0.755	0.803	0.832	0.844	0.884	0.887	0.917
CM		-0.012	-0.008	-0.005	-0.000	0.002	0.004	0.012	0.014	0.008	0.010	0.000
DCP 1	.010	0.916	1.140	1.315	1.515	1.771	1.895	1.555	2.075	2.154	2.214	2.263
DCP 2	.020	0.790	1.002	1.168	1.268	1.430	1.651	1.785	1.847	1.969	2.059	2.081
DCP 3	.030	1.458	1.703	1.916	2.117	2.315	2.588	2.853	3.000	3.147	3.283	3.366
DCP 4	.049	0.995	1.173	1.285	1.411	1.507	1.563	1.683	1.782	1.864	1.828	1.854
DCP 5	.074	1.678	1.573	2.237	2.454	2.625	2.708	2.838	2.937	2.877	2.897	2.811
DCP 6	.099	1.521	1.761	2.062	2.351	2.581	2.657	2.716	2.725	2.735	2.505	2.426
DCP 7	.149	0.913	0.588	1.106	1.865	2.282	2.442	2.398	2.134	2.075	2.092	2.136
DCP 8	.200	0.785	0.892	0.950	0.566	1.123	1.454	1.680	1.758	1.768	1.757	1.695
DCP 9	.250	0.737	0.801	0.855	0.902	0.555	1.026	1.224	1.406	1.505	1.583	1.665
DCP10	.300	0.642	0.721	0.772	0.806	0.850	0.850	0.943	1.059	1.173	1.256	1.247
DCP11	.395	0.534	0.565	0.594	0.655	0.705	0.733	0.702	0.741	0.856	0.885	0.887
DCP12	.501	0.398	0.438	0.446	0.501	0.534	0.515	0.548	0.534	0.572	0.577	0.627
DCP13	.600	0.355	0.356	0.375	0.418	0.445	0.449	0.414	0.432	0.427	0.449	0.464
DCP14	.701	0.348	0.371	0.375	0.360	0.356	0.395	0.364	0.321	0.334	0.315	0.326
DCP15	.800	0.146	0.140	0.166	0.176	0.159	0.176	0.155	0.133	0.152	0.115	0.156
DCP16	.900	-0.124	-0.124	-0.118	-0.127	-0.116	-0.087	-0.098	-0.095	-0.086	-0.096	-0.027
DCP17	.969	-0.061	-0.086	-0.085	-0.083	-0.080	-0.076	-0.135	-0.081	-0.060	-0.077	-0.030

DATA TYPE	X/C											
ALPHA		10.214	10.806	11.651	12.259	12.544	13.115	14.013	14.517	15.061	15.504	16.226
CN		0.936	0.906	0.915	0.932	0.904	0.832	0.824	0.814	0.841	0.845	0.857
CM		-0.013	-0.025	-0.045	-0.060	-0.074	-0.071	-0.079	-0.074	-0.077	-0.076	-0.075
DCP 1	.010	2.267	2.293	1.971	1.811	1.482	1.244	1.125	1.150	1.146	1.115	1.112
DCP 2	.020	2.121	2.294	1.833	1.616	1.367	1.136	1.042	1.003	1.037	1.035	1.037
DCP 3	.030	3.337	3.255	2.773	2.666	2.096	1.836	1.710	1.663	1.644	1.637	1.675
DCP 4	.049	1.828	1.672	1.657	1.667	1.741	1.700	1.677	1.602	1.597	1.562	1.570
DCP 5	.074	2.680	2.501	2.481	2.448	2.472	2.465	2.484	2.452	2.472	2.449	2.495
DCP 6	.099	2.381	2.133	2.163	2.156	2.281	2.242	2.231	2.193	2.264	2.255	2.353
DCP 7	.149	2.070	1.894	1.732	1.733	1.607	1.402	1.237	1.310	1.419	1.497	1.495
DCP 8	.200	1.821	1.665	1.471	1.424	1.143	0.556	0.943	1.322	1.006	1.117	1.055
DCP 9	.250	1.553	1.483	1.326	1.347	1.165	1.057	0.581	0.598	1.035	1.040	1.027
DCP10	.300	1.267	1.260	1.166	1.173	1.042	0.949	0.916	0.889	0.930	0.955	0.578
DCP11	.399	0.568	0.951	1.050	1.027	1.020	0.890	0.845	0.847	0.891	0.935	0.898
DCP12	.501	0.718	0.691	0.835	0.846	0.830	0.730	0.744	0.757	0.780	0.777	0.788
DCP13	.600	0.510	0.533	0.641	0.682	0.740	0.668	0.721	0.673	0.693	0.687	0.714
DCP14	.701	0.405	0.408	0.539	0.605	0.645	0.645	0.657	0.620	0.675	0.667	0.658
DCP15	.800	0.197	0.265	0.376	0.395	0.465	0.531	0.553	0.514	0.532	0.507	0.524
DCP16	.900	-0.007	0.048	0.055	0.075	0.156	0.160	0.177	0.168	0.143	0.164	0.162
DCP17	.965	-0.033	-0.024	-0.011	0.020	0.016	-0.025	-0.005	-0.014	0.006	-0.017	-0.017

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.592 Rn = 3.2 x 10^6 FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C						
ALPHA		16.865	17.408	17.560	18.882	19.336	19.518
CN		0.878	0.911	0.932	0.952	0.985	0.987
CM		-0.075	-0.083	-0.091	-0.091	-0.096	-0.097
DCP 1	.010	1.145	1.152	1.147	1.152	1.184	1.185
DCP 2	.020	1.028	1.071	1.089	1.108	1.095	1.119
DCP 3	.030	1.711	1.731	1.736	1.610	1.830	1.814
DCP 4	.049	1.625	1.637	1.587	1.495	1.512	1.477
DCP 5	.074	2.471	2.527	2.534	2.487	2.486	2.441
DCP 6	.099	2.[illegible]75	2.424	2.387	2.456	2.518	2.461
DCP 7	.149	1.585	1.740	1.786	1.805	1.570	2.080
DCP 8	.200	1.086	1.155	1.132	1.251	1.297	1.243
DCP 9	.250	1.088	1.125	1.148	1.185	1.225	1.235
DCP10	.300	0.993	1.041	1.043	1.104	1.135	1.136
DCP11	.399	0.917	0.937	0.974	1.025	1.057	1.066
DCP12	.501	0.811	0.835	0.876	0.885	0.917	0.911
DCP13	.600	0.735	0.735	0.763	0.802	0.757	0.815
DCP14	.701	0.669	0.688	0.727	0.736	0.755	0.740
DCP15	.800	0.544	0.562	0.586	0.595	0.603	0.605
DCP16	.900	0.188	0.190	0.226	0.230	0.243	0.257
DCP17	.969	-0.008	-0.000	0.025	0.012	0.016	0.004

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.594 Rn = 6.3 x 10^6

DATA TYPE	X/C											
ALPHA		-9.525	-8.528	-8.253	-7.742	-7.127	-6.253	-5.805	-5.341	-4.820	-4.010	-3.568
CN		-0.675	-0.671	-0.598	-0.573	-0.550	-0.495	-0.465	-0.435	-0.366	-0.314	-0.263
CM		0.015	0.007	-0.016	-0.028	-0.032	-0.040	-0.038	-0.036	-0.031	-0.026	-0.022
DCP 1	.010	-2.076	-1.931	-1.777	-2.137	-1.697	-1.748	-1.649	-1.786	-1.875	-2.002	-2.021
DCP 2	.020	-1.835	-1.614	-1.624	-1.829	-1.608	-1.619	-1.552	-1.633	-1.760	-1.807	-1.747
DCP 3	.030	-2.790	-3.164	-3.018	-2.796	-3.005	-2.827	-2.412	-2.758	-2.667	-2.628	-2.386
DCP 4	.049	-1.337	-1.255	-1.323	-1.416	-1.421	-1.396	-1.295	-1.192	-1.308	-1.195	-0.948
DCP 5	.074	-1.837	-1.902	-1.829	-1.856	-1.996	-1.995	-1.961	-1.831	-1.647	-1.298	-0.935
DCP 6	.099	-1.705	-1.773	-1.585	-1.641	-1.715	-1.675	-1.641	-1.562	-1.221	-0.875	-0.631
DCP 7	.149	-1.433	-1.576	-1.469	-1.433	-1.430	-1.388	-1.375	-1.211	-0.810	-0.618	-0.512
DCP 8	.200	-0.995	-1.162	-1.191	-1.088	-1.272	-1.092	-1.063	-0.946	-0.626	-0.478	-0.424
DCP 9	.250	-0.975	-1.062	-1.105	-1.018	-0.[illegible]7	-0.882	-0.773	-0.736	-0.447	-0.410	-0.364
DCP10	.300	-0.899	-0.868	-0.842	-0.582	-0.728	-0.623	-0.568	-0.486	-0.416	-0.311	-0.267
DCP11	.399	-0.756	-0.627	-0.609	-0.574	-0.443	-0.393	-0.352	-0.268	-0.268	-0.244	-0.179
DCP12	.501	-0.616	-0.490	-0.425	-0.361	-0.333	-0.257	-0.233	-0.220	-0.208	-0.175	-0.145
DCP13	.600	-0.360	-0.442	-0.271	-0.130	-0.183	-0.096	-0.103	-0.079	-0.074	-0.093	-0.071
DCP14	.701	-0.227	-0.128	-0.007	0.032	0.081	0.087	0.062	0.058	0.059	0.073	0.072
DCP15	.800	-0.068	-0.090	0.017	0.061	0.050	0.068	0.067	0.066	0.043	0.029	0.033
DCP16	.900	-0.138	-0.121	-0.048	-0.062	-0.062	-0.023	-0.022	-0.051	-0.055	-0.067	-0.083
DCP17	.969	-0.064	-0.068	-0.000	0.020	0.014	0.009	0.008	-0.009	0.004	-0.014	-0.015

DATA TYPE	X/C											
ALPHA		-2.942	-2.333	-1.405	-1.097	-0.481	0.236	0.838	1.211	1.831	2.804	3.238
CN		-0.210	-0.149	-0.088	-0.024	0.044	0.112	0.178	0.245	0.312	0.376	0.444
CM		-0.019	-0.018	-0.015	-0.014	-0.015	-0.014	-0.015	-0.015	-0.013	-0.013	-0.012
DCP 1	.010	-1.925	-1.758	-1.501	-1.123	-0.795	-0.518	-0.252	0.001	0.229	0.447	0.687
DCP 2	.020	-1.717	-1.533	-0.883	-0.776	-0.561	-0.352	-0.166	0.053	0.254	0.439	0.632
DCP 3	.030	-1.572	-1.320	-1.155	-0.875	-0.602	-0.285	0.007	0.312	0.601	0.904	1.196
DCP 4	.049	-0.667	-0.532	-0.396	-0.267	-0.106	0.030	0.186	0.341	0.532	0.665	0.846
DCP 5	.074	-0.675	-0.503	-0.320	-0.141	0.082	0.325	0.507	0.727	0.978	1.213	1.474
DCP 6	.099	-0.511	-0.364	-0.192	-0.012	0.156	0.355	0.536	0.731	0.923	1.141	1.363
DCP 7	.149	-0.400	-0.279	-0.182	-0.024	0.102	0.248	0.381	0.527	0.681	0.746	0.880
DCP 8	.200	-0.349	-0.241	-0.144	-0.041	0.076	0.210	0.295	0.402	0.524	0.638	0.765
DCP 9	.250	-0.289	-0.180	-0.103	-0.068	0.068	0.169	0.264	0.361	0.464	0.547	0.651
DCP10	.300	-0.195	-0.140	-0.045	0.020	0.109	0.180	0.260	0.340	0.414	0.525	0.586
DCP11	.399	-0.148	-0.099	-0.037	0.028	0.095	0.160	0.228	0.284	0.358	0.410	0.476
DCP12	.501	-0.112	-0.077	-0.039	0.017	0.062	0.126	0.174	0.213	0.267	0.305	0.344
DCP13	.600	-0.040	-0.013	0.026	0.058	0.098	0.141	0.168	0.202	0.234	0.267	0.294
DCP14	.701	0.075	0.111	0.134	0.152	0.17[illegible]	0.196	0.230	0.255	0.270	0.306	0.322
DCP15	.800	0.041	0.051	0.064	0.056	0.097	0.083	0.135	0.125	0.131	0.121	0.153
DCP16	.900	-0.103	-0.103	-0.112	-0.120	-0.122	-0.113	-0.105	-0.107	-0.110	-0.107	-0.058
DCP17	.969	-0.014	-0.027	-0.030	-0.032	-0.052	-0.061	-0.062	-0.056	-0.072	-0.059	-0.073

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

$M = 0.594 \quad Rn = 6.3 \times 10^6$

DATA TYPE	X/C											
ALPHA		3.647	4.318	5.186	5.457	5.973	6.784	7.601	7.874	8.336	9.315	9.932
CN		0.514	0.582	0.631	0.711	0.771	0.828	0.871	0.901	0.886	0.906	0.892
CM		-0.012	-0.009	-0.006	-0.004	-0.000	0.002	0.008	0.013	0.016	0.013	0.011
DCP 1	.010	0.923	1.134	1.328	1.552	1.768	1.927	2.021	2.103	2.163	2.191	2.228
DCP 2	.020	0.849	1.019	1.163	1.306	1.480	1.716	1.836	1.937	2.006	2.054	2.091
DCP 3	.030	1.486	1.734	1.971	2.149	2.303	2.713	2.950	3.119	3.211	3.302	3.377
DCP 4	.049	1.033	1.182	1.306	1.416	1.472	1.601	1.722	1.827	1.893	1.931	1.948
DCP 5	.074	1.746	2.045	2.311	2.507	2.609	2.750	2.921	3.069	3.146	3.146	3.072
DCP 6	.099	1.597	1.981	2.365	2.580	2.699	2.828	2.977	3.078	2.989	2.990	2.585
DCP 7	.149	1.035	1.104	1.104	1.875	2.438	2.591	2.676	2.554	2.219	2.176	2.082
DCP 8	.200	0.838	0.955	0.997	0.995	1.121	1.423	1.654	1.742	1.825	1.833	1.802
DCP 9	.250	0.738	0.825	0.889	0.914	0.911	0.986	1.171	1.391	1.386	1.463	1.526
DCP10	.300	0.660	0.736	0.777	0.813	0.853	0.832	0.832	1.033	1.083	1.177	1.183
DCP11	.399	0.541	0.620	0.642	0.683	0.708	0.754	0.764	0.762	0.792	0.827	0.862
DCP12	.501	0.393	0.437	0.475	0.516	0.528	0.565	0.564	0.570	0.532	0.548	0.569
DCP13	.600	0.351	0.379	0.411	0.418	0.443	0.463	0.460	0.451	0.413	0.423	0.415
DCP14	.701	0.350	0.367	0.368	0.398	0.407	0.398	0.399	0.361	0.339	0.319	0.308
DCP15	.800	0.161	0.162	0.175	0.195	0.198	0.200	0.196	0.170	0.153	0.156	0.169
DCP16	.900	-0.087	-0.105	-0.119	-0.099	-0.093	-0.076	-0.086	-0.091	-0.097	-0.069	-0.062
DCP17	.969	-0.092	-0.080	-0.072	-0.083	-0.078	-0.073	-0.083	-0.087	-0.078	-0.067	-0.108

DATA TYPE	X/C											
ALPHA		10.279	10.895	11.600	12.432	12.608	13.172	14.078	14.820	15.038	15.615	16.221
CN		0.902	0.898	0.936	0.928	0.965	0.942	0.921	0.865	0.850	0.886	0.927
CM		0.000	-0.006	-0.025	-0.041	-0.064	-0.068	-0.075	-0.083	-0.083	-0.091	-0.093
DCP 1	.010	2.268	2.297	2.274	2.160	1.957	1.774	1.959	2.082	2.103	2.125	2.144
DCP 2	.020	2.139	2.170	2.139	1.980	1.786	1.594	1.880	2.104	2.088	2.045	2.023
DCP 3	.030	3.417	3.318	3.258	3.209	2.985	2.878	3.343	3.401	3.224	2.993	2.956
DCP 4	.049	1.901	1.735	1.795	1.631	1.715	1.636	1.685	1.626	1.611	1.620	1.665
DCP 5	.074	2.757	2.477	2.608	2.459	2.580	2.546	2.616	1.955	2.057	2.260	2.481
DCP 6	.099	2.375	2.299	2.294	2.283	2.406	2.337	2.374	1.409	1.371	1.410	1.503
DCP 7	.149	2.052	2.090	1.930	1.677	1.667	1.631	1.357	1.246	1.200	1.208	1.316
DCP 8	.200	1.788	1.770	1.629	1.383	1.394	1.276	1.114	1.138	1.096	1.143	1.219
DCP 9	.250	1.565	1.456	1.418	1.411	1.269	1.205	1.011	1.082	1.026	1.072	1.154
DCP10	.300	1.229	1.233	1.268	1.275	1.160	1.156	1.019	1.031	0.994	1.047	1.084
DCP11	.399	0.946	1.011	1.075	1.132	1.117	1.035	0.938	0.917	0.937	0.945	1.012
DCP12	.501	0.629	0.635	0.763	0.792	0.902	0.925	0.867	0.801	0.757	0.824	0.882
DCP13	.600	0.414	0.458	0.584	0.605	0.700	0.704	0.713	0.705	0.658	0.800	0.852
DCP14	.701	0.320	0.345	0.420	0.491	0.613	0.594	0.644	0.685	0.616	0.680	0.605
DCP15	.800	0.184	0.184	0.223	0.310	0.386	0.449	0.516	0.499	0.488	0.538	0.585
DCP16	.900	-0.025	-0.028	0.042	0.071	0.170	0.172	0.241	0.234	0.313	0.275	0.284
DCP17	.969	-0.066	-0.057	-0.040	-0.057	0.006	0.004	0.051	0.088	0.097	0.056	0.066

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.594 Rn = 6.3 x 10^6 FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C						
ALPHA		17.060	17.356	18.046	18.665	19.471	19.856
CN		0.906	0.929	0.946	0.943	1.005	0.995
CM		-0.092	-0.096	-0.095	-0.092	-0.106	-0.105
DCP 1	.010	2.129	2.157	2.177	2.190	2.201	2.187
DCP 2	.020	1.950	2.026	2.000	2.066	2.049	2.025
DCP 3	.030	2.863	2.946	2.864	2.898	2.883	2.829
DCP 4	.049	1.640	1.664	1.682	1.681	1.732	1.708
DCP 5	.074	2.506	2.620	2.721	2.753	2.880	2.851
DCP 6	.099	1.464	1.464	1.496	1.541	1.594	1.624
DCP 7	.149	1.248	1.285	1.312	1.351	1.398	1.398
DCP 8	.200	1.185	1.210	1.250	1.250	1.330	1.305
DCP 9	.250	1.132	1.110	1.156	1.183	1.232	1.251
DCP10	.300	1.034	1.070	1.101	1.104	1.146	1.168
DCP11	.399	0.987	1.000	1.033	0.995	1.076	1.081
DCP12	.501	0.804	0.853	0.896	0.907	0.986	0.946
DCP13	.600	0.762	0.820	0.832	0.737	0.892	0.836
DCP14	.701	0.753	0.704	0.740	0.699	0.771	0.835
DCP15	.800	0.579	0.596	0.582	0.609	0.619	0.625
DCP16	.900	0.241	0.301	0.260	0.271	0.318	0.281
DCP17	.969	0.074	0.067	0.033	0.062	0.079	0.065

M = 0.597 Rn = 9.4 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		-8.847	-8.153	-7.394	-7.197	-6.583	-5.789	-5.041	-4.676	-4.040	-3.413	-2.513
CN		-0.662	-0.630	-0.563	-0.577	-0.522	-0.483	-0.457	-0.437	-0.350	-0.296	-0.237
CM		-0.019	-0.027	-0.040	-0.049	-0.050	-0.049	-0.044	-0.041	-0.035	-0.030	-0.027
DCP 1	.010	-2.693	-2.696	-3.038	-3.216	-3.145	-3.279	-3.268	-3.374	-3.337	-3.401	-3.414
DCP 2	.020	-3.079	-2.961	-3.224	-3.017	-3.060	-3.097	-2.836	-3.011	-3.015	-3.016	-2.577
DCP 3	.030	-2.655	-2.633	-2.616	-2.606	-2.662	-2.572	-2.694	-2.708	-2.491	-2.320	-1.804
DCP 4	.049	-2.324	-2.264	-1.992	-2.466	-2.394	-2.224	-2.117	-2.207	-1.932	-1.554	-1.046
DCP 5	.074	-1.880	-1.931	-1.814	-2.125	-2.043	-1.974	-1.617	-1.583	-1.283	-0.895	-0.662
DCP 6	.099	-1.737	-1.732	-1.657	-1.756	-1.800	-1.701	-1.529	-1.202	-0.841	-0.626	-0.477
DCP 7	.149	-1.301	-1.392	-1.570	-1.402	-1.241	-1.142	-1.114	-0.797	-0.606	-0.481	-0.406
DCP 8	.200	-1.116	-1.147	-1.089	-1.138	-0.991	-0.869	-0.680	-0.585	-0.516	-0.436	-0.350
DCP 9	.250	-1.176	-1.057	-0.902	-0.935	-0.715	-0.604	-0.564	-0.495	-0.409	-0.346	-0.274
DCP10	.300	-0.976	-0.855	-0.662	-0.695	-0.563	-0.473	-0.443	-0.359	-0.321	-0.276	-0.184
DCP11	.399	-0.655	-0.625	-0.416	-0.426	-0.375	-0.309	-0.307	-0.273	-0.237	-0.184	-0.136
DCP12	.501	-0.419	-0.384	-0.313	-0.260	-0.242	-0.227	-0.214	-0.168	-0.162	-0.141	-0.096
DCP13	.600	-0.280	-0.229	-0.144	-0.117	-0.106	-0.136	-0.106	-0.095	-0.075	-0.066	-0.036
DCP14	.701	-0.029	0.006	0.046	0.062	0.083	0.092	0.076	0.081	0.076	0.083	0.101
DCP15	.800	-0.028	0.017	0.049	0.045	0.056	0.059	0.040	0.039	0.040	0.031	0.027
DCP16	.900	-0.069	-0.066	-0.041	-0.025	-0.021	-0.032	-0.032	-0.069	-0.086	-0.057	-0.107
DCP17	.969	-0.019	-0.017	-0.017	0.006	0.012	-0.014	-0.032	-0.006	-0.004	-0.024	-0.016

DATA TYPE	X/C											
ALPHA		-2.356	-1.847	-1.153	-0.321	0.201	0.591	1.320	2.157	2.505	3.031	3.854
CN		-0.180	-0.112	-0.042	0.031	0.113	0.179	0.250	0.322	0.396	0.468	0.539
CM		-0.023	-0.021	-0.018	-0.016	-0.017	-0.015	-0.014	-0.013	-0.011	-0.009	-0.006
DCP 1	.010	-3.389	-2.821	-2.091	-1.537	-0.517	-0.371	-0.266	0.112	0.613	1.020	1.265
DCP 2	.020	-2.202	-1.551	-1.269	-0.904	-0.562	-0.219	0.129	0.453	0.780	1.114	1.435
DCP 3	.030	-1.306	-1.142	-0.859	-0.556	-0.265	0.012	0.313	0.610	0.909	1.191	1.472
DCP 4	.049	-0.657	-0.657	-0.421	-0.179	0.103	0.331	0.586	0.850	1.134	1.419	1.717
DCP 5	.074	-0.519	-0.335	-0.143	0.074	0.276	0.493	0.737	0.959	1.199	1.434	1.722
DCP 6	.099	-0.336	-0.176	-0.025	0.166	0.350	0.540	0.726	0.927	1.126	1.322	1.553
DCP 7	.149	-0.284	-0.154	-0.027	0.089	0.236	0.376	0.516	0.643	0.792	0.925	1.053
DCP 8	.200	-0.266	-0.156	-0.056	0.065	0.182	0.283	0.410	0.524	0.632	0.733	0.834
DCP 9	.250	-0.192	-0.117	-0.017	0.076	0.177	0.289	0.364	0.462	0.553	0.646	0.734
DCP10	.300	-0.140	-0.054	0.026	0.115	0.191	0.246	0.356	0.426	0.510	0.591	0.656
DCP11	.399	-0.079	-0.028	0.041	0.138	0.161	0.233	0.292	0.360	0.436	0.480	0.529
DCP12	.501	-0.072	-0.019	0.027	0.076	0.129	0.155	0.211	0.264	0.295	0.366	0.412
DCP13	.600	-0.014	0.007	0.052	0.078	0.137	0.157	0.206	0.237	0.267	0.301	0.337
DCP14	.701	0.121	0.149	0.162	0.187	0.230	0.261	0.264	0.296	0.319	0.342	0.366
DCP15	.800	0.037	0.048	0.061	0.065	0.091	0.101	0.123	0.122	0.151	0.163	0.175
DCP16	.900	-0.117	-0.120	-0.125	-0.124	-0.114	-0.111	-0.124	-0.107	-0.106	-0.105	-0.094
DCP17	.969	-0.038	-0.049	-0.064	-0.050	-0.049	-0.062	-0.063	-0.060	-0.084	-0.077	-0.083

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.597 Rn = 9.4 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		4.591	4.887	5.499	6.158	7.053	7.258	8.016	8.554	9.288	9.524	10.226
CN		0.616	0.670	0.736	0.808	0.884	0.930	0.968	0.946	0.996	0.983	0.979
CM		-0.004	-0.001	0.001	0.006	0.014	0.018	0.024	0.027	0.023	0.014	-0.001
DCP 1	.010	1.825	1.951	2.440	2.742	3.064	3.137	3.508	3.297	3.372	3.553	3.481
DCP 2	.020	1.724	1.985	2.224	2.552	2.918	3.132	3.297	3.403	3.490	3.556	3.631
DCP 3	.030	1.725	1.952	2.111	2.312	2.757	2.984	3.140	3.246	3.353	3.434	3.509
DCP 4	.049	1.966	2.203	2.375	2.465	2.532	2.537	2.547	2.548	2.559	2.563	2.573
DCP 5	.074	1.987	2.278	2.468	2.593	2.731	2.928	3.070	3.180	3.292	3.353	3.416
DCP 6	.099	2.022	2.353	2.579	2.705	2.844	2.999	3.123	3.219	3.252	3.076	2.801
DCP 7	.149	1.159	1.113	1.501	2.028	2.631	2.741	2.781	2.385	2.235	1.915	1.650
DCP 8	.200	0.931	1.002	1.005	1.277	1.562	1.788	1.960	1.906	1.608	1.589	1.428
DCP 9	.250	0.811	0.691	0.922	0.941	1.027	1.201	1.365	1.367	1.677	1.579	1.497
DCP10	.300	0.736	0.781	0.837	0.856	0.853	0.902	0.983	0.993	1.408	1.295	1.267
DCP11	.399	0.598	0.649	0.697	0.738	0.759	0.766	0.808	0.830	0.960	1.058	1.070
DCP12	.501	0.438	0.490	0.519	0.549	0.564	0.576	0.568	0.599	0.641	0.615	0.729
DCP13	.600	0.380	0.400	0.430	0.446	0.456	0.445	0.441	0.399	0.434	0.444	0.478
DCP14	.701	0.382	0.397	0.408	0.407	0.410	0.391	0.341	0.303	0.299	0.306	0.370
DCP15	.800	0.177	0.183	0.191	0.196	0.188	0.195	0.167	0.148	0.130	0.165	0.228
DCP16	.900	-0.096	-0.102	-0.093	-0.082	-0.086	-0.075	-0.074	-0.084	-0.097	-0.055	0.004
DCP17	.969	-0.075	-0.085	-0.075	-0.078	-0.078	-0.093	-0.058	-0.090	-0.066	-0.018	-0.064

DATA TYPE	X/C											
ALPHA		10.797	11.772	12.074	12.754	13.204	13.931	14.665	15.240	15.761	16.402	17.127
CN		0.997	1.001	0.959	0.965	0.968	0.988	0.994	0.997	0.939	0.985	1.000
CM		-0.011	-0.019	-0.025	-0.027	-0.034	-0.045	-0.059	-0.065	-0.063	-0.086	-0.091
DCP 1	.010	3.574	3.572	3.551	3.387	3.254	2.996	3.051	2.701	3.133	1.874	1.845
DCP 2	.020	3.700	3.774	3.755	3.495	3.484	3.181	3.215	2.677	3.022	1.851	1.783
DCP 3	.030	3.603	3.696	3.736	3.589	3.597	3.349	3.546	3.004	2.759	2.052	2.007
DCP 4	.049	2.593	2.564	2.525	2.292	2.301	2.174	2.432	2.229	2.521	2.498	2.536
DCP 5	.074	3.403	3.029	2.780	2.314	2.236	2.131	2.352	2.161	2.193	2.416	2.531
DCP 6	.099	2.609	2.495	2.292	2.172	2.112	2.036	2.214	2.102	1.680	2.238	2.327
DCP 7	.149	1.654	1.687	1.465	1.748	1.696	1.712	1.556	1.741	1.479	1.814	1.893
DCP 8	.200	1.485	1.471	1.316	1.505	1.440	1.481	1.262	1.361	1.271	1.156	1.170
DCP 9	.250	1.430	1.491	1.374	1.461	1.430	1.552	1.310	1.375	1.218	1.191	1.130
DCP10	.300	1.296	1.243	1.175	1.292	1.299	1.375	1.172	1.221	1.173	1.139	1.097
DCP11	.399	0.991	1.092	1.056	1.061	1.047	1.121	1.034	1.129	0.984	1.041	1.023
DCP12	.501	0.800	0.782	0.771	0.747	0.815	0.891	0.872	0.869	0.839	0.904	0.903
DCP13	.600	0.570	0.562	0.585	0.601	0.584	0.654	0.819	0.793	0.737	0.816	0.806
DCP14	.701	0.419	0.439	0.455	0.467	0.542	0.502	0.583	0.621	0.599	0.718	0.770
DCP15	.800	0.261	0.269	0.298	0.278	0.333	0.344	0.435	0.474	0.468	0.545	0.655
DCP16	.900	0.012	0.081	0.063	0.062	0.069	0.086	0.155	0.118	0.157	0.232	0.214
DCP17	.969	-0.006	-0.002	0.025	-0.001	-0.057	-0.008	0.028	-0.003	0.009	0.042	0.028

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.597 Rn = 9.4 x 10^6 FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C				
ALPHA		17.621	18.054	19.457	20.193
CN		1.006	1.002	1.032	1.056
CM		-0.091	-0.084	-0.089	-0.093
DCP 1	.010	1.845	1.875	1.857	2.168
DCP 2	.020	1.792	1.803	1.824	2.165
DCP 3	.030	2.001	1.945	1.875	2.407
DCP 4	.049	2.542	2.569	2.560	2.324
DCP 5	.074	2.502	2.547	2.576	2.281
DCP 6	.099	2.350	2.340	2.377	2.138
DCP 7	.149	1.954	2.112	2.162	1.987
DCP 8	.200	1.198	1.186	1.287	1.395
DCP 9	.250	1.139	1.147	1.205	1.380
DCP10	.300	1.070	1.082	1.139	1.277
DCP11	.399	1.004	1.027	1.058	1.123
DCP12	.501	0.925	0.869	0.922	0.991
DCP13	.600	0.846	0.806	0.820	0.870
DCP14	.701	0.752	0.739	0.755	0.773
DCP15	.800	0.627	0.612	0.624	0.593
DCP16	.900	0.235	0.222	0.232	0.205
DCP17	.969	0.036	-0.001	0.019	0.027

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.593 Rn = 9.4×10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		1.204	1.756	2.363	3.035	3.761	4.445	4.781	5.413	5.567	6.685	7.426
CN		0.244	0.316	0.389	0.466	0.544	0.618	0.681	0.750	0.807	0.882	0.935
CM		-0.014	-0.014	-0.012	-0.012	-0.010	-0.005	-0.003	-0.001	0.005	0.011	0.018
DCP 1	.010	-0.081	0.324	0.734	1.096	1.492	1.686	2.252	2.594	3.030	3.293	3.457
DCP 2	.020	0.039	0.395	0.729	1.067	1.393	1.705	1.994	2.252	2.493	2.943	3.186
DCP 3	.030	0.264	0.541	0.853	1.164	1.466	1.740	1.580	2.169	2.350	2.772	3.014
DCP 4	.049	0.549	0.814	1.085	1.374	1.699	1.588	2.232	2.400	2.488	2.760	2.971
DCP 5	.074	0.695	0.917	1.157	1.415	1.709	1.978	2.285	2.474	2.604	2.767	2.970
DCP 6	.099	0.658	0.880	1.085	1.314	1.552	1.587	2.341	2.563	2.710	2.837	2.996
DCP 7	.149	0.518	0.639	0.746	0.895	1.043	1.133	1.081	1.543	1.946	2.647	2.781
DCP 8	.200	0.384	0.497	0.620	0.730	0.835	0.934	0.991	1.004	1.166	1.205	1.424
DCP 9	.250	0.350	0.454	0.552	0.639	0.728	0.822	0.889	0.939	0.951	0.990	1.192
DCP10	.300	0.339	0.418	0.496	0.573	0.657	0.724	0.802	0.840	0.863	0.840	0.886
DCP11	.399	0.288	0.339	0.408	0.478	0.534	0.594	0.655	0.706	0.745	0.768	0.786
DCP12	.501	0.226	0.273	0.326	0.352	0.419	0.466	0.508	0.530	0.548	0.586	0.595
DCP13	.600	0.208	0.237	0.272	0.330	0.355	0.398	0.426	0.454	0.476	0.478	0.478
DCP14	.701	0.264	0.308	0.311	0.347	0.373	0.385	0.420	0.435	0.416	0.434	0.416
DCP15	.800	0.116	0.140	0.146	0.174	0.186	0.183	0.190	0.196	0.203	0.207	0.180
DCP16	.900	-0.125	-0.124	-0.105	-0.099	-0.104	-0.109	-0.098	-0.084	-0.080	-0.075	-0.079
DCP17	.969	-0.066	-0.062	-0.071	-0.083	-0.066	-0.081	-0.103	-0.083	-0.103	-0.094	-0.089

DATA TYPE	X/C											
ALPHA		8.105	8.484	9.081	9.710	10.182	11.045	11.676	11.566	12.575	13.263	13.826
CN		0.997	1.006	1.031	1.027	1.036	1.021	1.010	0.928	1.022	1.003	0.976
CM		0.024	0.026	0.024	0.015	-0.002	-0.014	-0.017	-0.012	-0.033	-0.043	-0.033
DCP 1	.010	3.609	3.719	3.787	3.826	3.873	3.683	3.651	4.060	3.761	3.704	3.925
DCP 2	.020	3.342	3.475	3.571	3.624	3.695	3.739	3.769	3.613	3.803	3.741	3.742
DCP 3	.030	3.192	3.329	3.407	3.466	3.536	3.615	3.668	3.206	3.664	3.567	3.334
DCP 4	.049	3.142	3.267	3.358	3.417	3.467	3.504	3.455	2.543	3.206	2.966	2.724
DCP 5	.074	3.133	3.240	3.313	3.367	3.307	3.240	2.889	2.106	2.629	2.540	2.336
DCP 6	.099	3.146	3.236	3.249	3.089	2.805	2.601	2.509	1.556	2.389	2.337	1.918
DCP 7	.149	2.885	2.531	2.252	1.586	1.763	1.578	1.532	1.795	1.580	1.535	1.613
DCP 8	.200	1.712	1.788	1.613	1.561	1.472	1.390	1.353	1.592	1.386	1.271	1.504
DCP 9	.250	1.365	1.489	1.685	1.578	1.525	1.388	1.358	1.406	1.368	1.242	1.405
DCP10	.300	1.092	1.264	1.384	1.349	1.381	1.245	1.284	1.292	1.226	1.221	1.280
DCP11	.399	0.805	0.808	0.997	1.096	1.087	1.092	1.106	0.969	1.072	1.035	1.080
DCP12	.501	0.595	0.594	0.634	0.715	0.738	0.801	0.815	0.735	0.843	0.835	0.803
DCP13	.600	0.473	0.447	0.456	0.399	0.595	0.630	0.592	0.543	0.690	0.722	0.633
DCP14	.701	0.392	0.350	0.315	0.334	0.393	0.439	0.489	0.400	0.607	0.534	0.476
DCP15	.800	0.197	0.168	0.168	0.154	0.226	0.254	0.255	0.250	0.291	0.377	0.324
DCP16	.900	-0.095	-0.099	-0.100	-0.039	0.003	0.061	0.043	-0.034	0.090	0.157	0.125
DCP17	.969	-0.098	-0.077	-0.058	-0.032	-0.049	-0.003	-0.028	-0.053	-0.029	0.025	-0.049

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

$M = 0.593$ $R_n = 9.4 \times 10^6$

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C										
ALPHA		14.720	15.284	15.375	16.179	16.792	17.467	18.180	18.896	19.153	19.627
CN		1.017	0.991	1.027	1.030	0.977	1.011	1.027	1.105	1.055	1.010
CM		-0.075	-0.060	-0.060	-0.068	-0.081	-0.092	-0.087	-0.073	-0.089	-0.086
DCP 1	.010	3.633	3.881	3.725	3.750	3.703	3.724	3.747	3.568	3.714	3.177
DCP 2	.020	3.678	3.698	3.416	3.361	3.501	3.555	3.532	3.251	3.457	2.822
DCP 3	.030	3.522	2.992	2.944	3.076	3.115	3.100	2.968	2.731	2.841	2.889
DCP 4	.049	2.805	2.566	2.389	2.553	2.762	2.827	2.846	2.611	2.535	1.955
DCP 5	.074	2.456	2.196	2.347	2.417	2.580	2.704	2.785	2.472	2.455	1.708
DCP 6	.099	2.056	1.780	2.217	1.791	1.422	1.392	1.492	2.204	1.829	1.671
DCP 7	.149	1.293	1.481	1.815	1.673	1.297	1.340	1.357	1.588	1.592	1.532
DCP 8	.200	1.220	1.436	1.443	1.406	1.194	1.224	1.277	1.609	1.296	1.346
DCP 9	.250	1.166	1.329	1.377	1.391	1.139	1.164	1.219	1.531	1.307	1.398
DCP10	.300	1.130	1.198	1.236	1.237	1.041	1.082	1.149	1.418	1.228	1.374
DCP11	.399	1.086	1.133	1.056	1.081	1.021	1.006	1.063	1.131	1.110	1.214
DCP12	.501	0.858	0.861	0.919	0.941	0.877	0.888	0.892	0.957	0.984	0.996
DCP13	.600	0.806	0.657	0.681	0.801	0.742	0.803	0.855	0.857	0.817	0.821
DCP14	.701	0.652	0.653	0.641	0.646	0.720	0.724	0.766	0.669	0.746	0.705
DCP15	.800	0.545	0.394	0.441	0.502	0.578	0.621	0.572	0.498	0.590	0.506
DCP16	.900	0.286	0.176	0.178	0.199	0.275	0.393	0.284	0.212	0.295	0.191
DCP17	.969	0.085	0.032	0.058	-0.033	0.070	0.048	0.075	0.024	0.068	0.023

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.699 Rn = 10.0 x 10^6

DATA TYPE	X/C											
ALPHA		-1.641	-0.944	-0.242	0.563	0.823	1.363	1.542	2.641	3.209	3.576	4.741
CN		-0.102	-0.028	0.061	0.146	0.224	0.312	0.388	0.481	0.576	0.691	0.755
CM		-0.026	-0.021	-0.020	-0.019	-0.015	-0.012	-0.011	-0.009	-0.006	-0.006	-0.003
DCP 1	.010	-2.395	-2.090	-1.411	-0.870	-0.458	-0.046	0.307	0.609	0.767	1.053	1.390
DCP 2	.020	-2.049	-1.472	-0.989	-0.617	-0.264	0.075	0.376	0.637	0.877	1.113	1.301
DCP 3	.030	-1.724	-0.878	-0.627	-0.312	-0.009	0.270	0.523	0.744	0.940	1.126	1.286
DCP 4	.049	-0.468	-0.440	-0.176	0.123	0.375	0.643	0.890	1.089	1.258	1.423	1.562
DCP 5	.074	-0.312	-0.128	0.121	0.385	0.628	0.861	1.038	1.212	1.409	1.559	1.694
DCP 6	.099	-0.174	0.010	0.247	0.493	0.764	1.041	1.222	1.379	1.539	1.680	1.867
DCP 7	.149	-0.137	0.014	0.185	0.344	0.496	0.832	1.247	1.431	1.565	1.698	1.815
DCP 8	.200	-0.133	-0.010	0.135	0.248	0.380	0.490	0.503	1.339	1.492	1.627	1.737
DCP 9	.250	-0.055	0.011	0.125	0.244	0.354	0.466	0.493	0.560	1.473	1.606	1.715
DCP10	.300	-0.042	0.045	0.146	0.242	0.345	0.425	0.482	0.480	0.658	1.536	1.650
DCP11	.399	-0.027	0.046	0.129	0.197	0.269	0.354	0.418	0.448	0.421	0.476	0.754
DCP12	.501	-0.007	0.044	0.096	0.15[illegible]	0.221	0.259	0.322	0.360	0.369	0.346	0.344
DCP13	.600	0.064	0.086	0.125	0.176	0.204	0.237	0.288	0.321	0.324	0.342	0.314
DCP14	.701	0.167	0.192	0.231	0.252	0.274	0.298	0.324	0.351	0.374	0.365	0.340
DCP15	.800	0.062	0.067	0.091	0.104	0.100	0.117	0.135	0.143	0.158	0.163	0.146
DCP16	.900	-0.123	-0.149	-0.139	-0.133	-0.139	-0.144	-0.145	-0.128	-0.131	-0.111	-0.106
DCP17	.969	-0.037	-0.048	-0.064	-0.060	-0.073	-0.068	-0.073	-0.081	-0.082	-0.069	-0.086

DATA TYPE	X/C											
ALPHA		5.216	5.586	6.337	6.815	7.297	7.586	8.639	9.636	9.810	10.392	11.048
CN		0.814	0.859	0.851	0.900	0.871	0.934	0.988	0.947	1.002	1.035	0.922
CM		-0.001	0.001	-0.005	-0.015	-0.020	-0.016	-0.024	-0.026	-0.040	-0.047	-0.050
DCP 1	.010	1.576	1.804	1.918	2.089	2.206	2.337	2.441	2.557	2.626	2.696	2.765
DCP 2	.020	1.467	1.589	1.691	1.829	1.971	2.121	2.260	2.345	2.457	2.571	2.627
DCP 3	.030	1.419	1.526	1.627	1.718	1.869	2.016	2.169	2.252	2.354	2.457	2.510
DCP 4	.049	1.687	1.767	1.826	1.939	1.971	2.071	2.186	2.258	2.347	2.439	2.494
DCP 5	.074	1.801	1.862	1.927	2.010	2.064	2.137	2.232	2.296	2.371	2.450	2.495
DCP 6	.099	1.923	1.946	2.044	2.107	2.158	2.208	2.292	2.340	2.419	2.477	2.484
DCP 7	.149	1.906	1.980	2.034	2.098	2.130	2.184	2.252	2.264	2.335	2.323	2.006
DCP 8	.200	1.836	1.904	1.927	2.016	1.730	2.055	2.166	1.679	1.941	1.977	1.035
DCP 9	.250	1.825	1.877	1.768	1.937	1.441	1.734	1.886	1.210	1.488	1.549	0.984
DCP10	.300	1.744	1.802	1.316	1.288	1.112	1.312	1.345	1.214	1.184	1.188	0.9[illegible]9
DCP11	.399	0.918	0.990	0.999	0.971	0.939	0.980	0.960	1.006	0.936	0.948	0.874
DCP12	.501	0.499	0.698	0.708	0.734	0.753	0.723	0.732	0.796	0.777	0.766	0.759
DCP13	.600	0.280	0.368	0.432	0.475	0.568	0.559	0.617	0.609	0.659	0.667	0.684
DCP14	.701	0.292	0.230	0.303	0.367	0.362	0.381	0.476	0.520	0.538	0.676	0.573
DCP15	.800	0.130	0.081	0.102	0.183	0.198	0.219	0.274	0.252	0.377	0.436	0.427
DCP16	.900	-0.120	-0.159	-0.121	-0.057	-0.025	-0.095	-0.035	-0.016	0.081	0.069	0.176
DCP17	.969	-0.079	-0.117	-0.092	-0.085	-0.030	-0.026	-0.076	-0.050	0.020	-0.023	0.034

M = 0.699 Rn = 10.0 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

DATA TYPE	X/C											
ALPHA		11.569	12.216	13.023	13.591	13.904	14.572	15.189	15.712	16.534	16.975	17.736
CN		0.956	0.940	0.971	0.995	0.982	1.031	1.047	1.085	1.122	1.150	1.185
CM		-0.054	-0.050	-0.055	-0.056	-0.049	-0.063	-0.065	-0.072	-0.082	-0.085	-0.110
DCP 1	.010	2.866	2.873	2.995	3.056	3.083	3.143	3.183	3.210	3.247	3.294	3.276
DCP 2	.020	2.726	2.776	2.663	2.920	2.960	3.052	3.112	3.158	3.217	3.217	3.193
DCP 3	.030	2.594	2.648	2.746	2.608	2.859	2.926	2.576	3.024	3.032	2.956	3.049
DCP 4	.049	2.566	2.607	2.692	2.704	2.747	2.839	2.851	2.866	2.852	2.667	2.094
DCP 5	.074	2.576	2.613	2.691	2.723	2.716	2.725	2.722	2.763	2.733	2.594	2.047
DCP 6	.099	2.536	2.536	2.572	2.601	2.591	2.576	2.494	2.543	2.513	2.465	2.219
DCP 7	.149	2.054	2.025	2.057	2.158	2.176	2.256	2.314	2.369	2.452	2.422	2.095
DCP 8	.200	1.081	1.060	1.027	1.121	1.094	1.093	1.135	1.206	1.282	1.481	1.866
DCP 9	.250	1.045	1.002	1.010	1.054	1.014	1.106	1.100	1.160	1.223	1.367	1.634
DCP10	.300	1.011	0.950	0.996	1.011	1.000	1.025	1.066	1.087	1.115	1.276	1.455
DCP11	.399	0.881	0.913	0.947	0.962	0.926	0.928	0.997	1.002	1.076	1.153	1.153
DCP12	.501	0.755	0.744	0.765	0.795	0.770	0.861	0.877	0.887	0.938	0.941	1.048
DCP13	.600	0.725	0.577	0.693	0.661	0.630	0.695	0.754	0.813	0.862	0.860	0.928
DCP14	.701	0.606	0.592	0.582	0.621	0.654	0.741	0.698	0.770	0.736	0.784	0.856
DCP15	.800	0.454	0.497	0.529	0.555	0.546	0.554	0.534	0.582	0.643	0.640	0.733
DCP16	.900	0.196	0.216	0.271	0.241	0.185	0.270	0.261	0.256	0.323	0.374	0.360
DCP17	.965	0.030	-0.035	-0.000	-0.013	-0.133	-0.058	-0.005	-0.057	0.023	-0.014	0.017

DATA TYPE	X/C			
ALPHA		18.183	18.625	19.249
CN		1.198	1.203	1.217
CM		-0.093	-0.122	-0.134
DCP 1	.010	3.316	3.301	3.069
DCP 2	.020	3.009	2.916	2.971
DCP 3	.030	2.675	2.657	2.592
DCP 4	.049	2.005	2.019	2.011
DCP 5	.074	2.064	1.868	1.943
DCP 6	.099	2.157	1.963	1.886
DCP 7	.149	2.312	2.156	1.999
DCP 8	.200	1.951	1.865	1.841
DCP 9	.250	1.757	1.667	1.752
DCP10	.300	1.573	1.525	1.572
DCP11	.399	1.466	1.307	1.357
DCP12	.501	1.171	1.075	1.146
DCP13	.600	0.922	0.926	1.020
DCP14	.701	0.763	0.940	0.926
DCP15	.800	0.612	0.762	0.604
DCP16	.900	0.203	0.360	0.394
DCP17	.965	-0.122	0.027	0.023

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.702 Rn = 10.0 x 10^6

ALPHA		-0.208	0.696	1.930	3.028	3.995	5.032	5.895	6.751	7.912	8.831	9.854
CN		0.139	0.272	0.434	0.575	0.720	0.817	0.840	0.934	0.917	0.991	0.944
CM		-0.018	-0.015	-0.009	-0.006	-0.004	-0.001	-0.009	-0.026	-0.009	-0.017	-0.025
DCP 1	.010	-1.039	-0.225	0.326	0.727	1.226	1.494	1.748	2.125	2.147	2.437	2.573
DCP 2	.020	-0.644	-0.077	0.452	0.848	1.164	1.446	1.633	1.875	2.035	2.272	2.421
DCP 3	.030	-0.341	0.139	0.605	0.945	1.201	1.426	1.570	1.766	1.948	2.173	2.311
DCP 4	.049	0.042	0.521	0.963	1.242	1.473	1.664	1.762	1.919	2.011	2.191	2.317
DCP 5	.074	0.477	0.872	1.191	1.486	1.663	1.845	1.946	2.066	2.134	2.281	2.370
DCP 6	.099	0.474	0.931	1.288	1.534	1.720	1.901	1.996	2.117	2.163	2.289	2.342
DCP 7	.149	0.328	0.520	1.306	1.542	1.721	1.882	1.975	2.102	2.132	2.241	2.248
DCP 8	.200	0.243	0.444	1.081	1.465	1.662	1.825	1.907	2.026	2.068	2.172	1.629
DCP 9	.250	0.235	0.419	0.474	1.450	1.632	1.783	1.742	1.927	1.994	2.004	1.273
DCP10	.300	0.216	0.365	0.479	0.664	1.562	1.715	1.300	1.318	1.295	1.335	1.172
DCP11	.399	0.190	0.325	0.434	0.410	0.713	0.967	0.929	0.967	1.000	1.030	1.060
DCP12	.501	0.156	0.247	0.330	0.364	0.321	0.635	0.691	0.778	0.742	0.843	0.816
DCP13	.600	0.170	0.229	0.292	0.336	0.307	0.288	0.440	0.576	0.555	0.587	0.622
DCP14	.701	0.258	0.305	0.340	0.370	0.347	0.246	0.281	0.414	0.347	0.417	0.442
DCP15	.800	0.094	0.116	0.142	0.145	0.162	0.114	0.133	0.205	0.122	0.175	0.270
DCP16	.900	-0.137	-0.141	-0.139	-0.121	-0.115	-0.139	-0.064	-0.014	-0.099	-0.061	-0.023
DCP17	.969	-0.057	-0.075	-0.083	-0.074	-0.084	-0.103	-0.102	-0.067	-0.084	-0.080	-0.080

ALPHA		9.708	9.885	10.621	10.948	10.928	10.866	10.967	11.688	11.854	12.073	12.029
CN		0.985	0.902	0.909	0.917	0.932	0.943	0.924	0.936	0.937	0.953	0.945
CM		-0.027	-0.031	-0.046	-0.047	-0.053	-0.049	-0.043	-0.051	-0.046	-0.047	-0.052
DCP 1	.010	2.591	2.597	2.672	2.601	2.595	2.681	2.778	2.729	2.807	2.841	2.829
DCP 2	.020	2.470	2.445	2.504	2.566	2.567	2.593	2.614	2.707	2.706	2.714	2.714
DCP 3	.030	2.359	2.331	2.399	2.459	2.455	2.478	2.502	2.566	2.563	2.601	2.602
DCP 4	.049	2.355	2.330	2.362	2.441	2.440	2.457	2.480	2.561	2.547	2.559	2.571
DCP 5	.074	2.424	2.404	2.451	2.501	2.469	2.519	2.529	2.614	2.603	2.618	2.618
DCP 6	.099	2.413	2.393	2.432	2.467	2.458	2.493	2.482	2.453	2.512	2.511	2.497
DCP 7	.149	2.344	2.148	2.027	2.026	2.042	2.074	2.052	2.045	2.096	2.101	2.044
DCP 8	.200	1.636	1.197	1.035	1.060	1.094	1.143	1.069	1.057	1.349	1.107	1.153
DCP 9	.250	1.308	1.131	1.012	1.037	1.036	1.055	1.024	0.984	1.035	1.057	1.020
DCP10	.300	1.225	1.009	0.965	0.964	0.967	1.051	0.976	0.911	0.962	1.009	0.962
DCP11	.399	1.119	0.965	0.903	0.896	0.870	0.923	0.872	0.898	0.910	0.907	0.879
DCP12	.501	0.816	0.763	0.811	0.731	0.760	0.758	0.821	0.760	0.777	0.806	0.766
DCP13	.600	0.641	0.586	0.622	0.695	0.660	0.670	0.674	0.695	0.653	0.678	0.646
DCP14	.701	0.491	0.498	0.550	0.556	0.678	0.604	0.557	0.602	0.550	0.613	0.643
DCP15	.800	0.246	0.280	0.365	0.420	0.415	0.395	0.400	0.475	0.451	0.400	0.435
DCP16	.900	0.020	0.040	0.173	0.136	0.165	0.161	0.117	0.169	0.159	0.171	0.219
DCP17	.969	-0.066	0.005	0.000	-0.001	-0.011	-0.009	-0.036	0.026	-0.024	-0.041	-0.003

AIRFOIL NLR 7223-62   STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.702   Rn = 10.0 x 10^6

ALPHA		12.353	12.803	12.960	12.849	13.297	13.831	13.940	13.761	13.964	14.560	15.022
CN		0.960	0.978	0.976	0.976	0.997	1.015	1.011	1.010	1.015	1.045	1.057
CM		-0.052	-0.056	-0.057	-0.052	-0.058	-0.063	-0.057	-0.057	-0.060	-0.065	-0.067
DCP 1	.010	2.928	2.818	2.805	2.661	2.968	2.862	2.998	2.956	3.011	3.112	3.138
DCP 2	.020	2.800	2.858	2.830	2.847	2.879	2.960	2.955	2.932	2.963	3.059	3.071
DCP 3	.030	2.661	2.733	2.698	2.718	2.759	2.843	2.833	2.811	2.844	2.934	2.951
DCP 4	.049	2.649	2.696	2.670	2.672	2.710	2.765	2.763	2.735	2.771	2.755	2.787
DCP 5	.074	2.677	2.698	2.705	2.691	2.704	2.725	2.748	2.699	2.729	2.685	2.749
DCP 6	.099	2.535	2.565	2.540	2.520	2.556	2.548	2.568	2.542	2.565	2.451	2.491
DCP 7	.149	2.081	2.109	2.111	2.154	2.131	2.199	2.204	2.223	2.238	2.297	2.335
DCP 8	.200	1.052	1.043	1.136	1.125	1.048	1.113	1.141	1.211	1.166	1.212	1.201
DCP 9	.250	1.028	0.995	1.027	1.107	1.051	1.055	1.073	1.096	1.078	1.126	1.133
DCP10	.300	0.973	0.996	0.958	0.970	1.068	1.076	1.011	0.956	0.977	1.068	1.021
DCP11	.399	0.890	0.915	0.852	0.918	0.941	0.935	0.915	0.943	0.936	1.008	1.006
DCP12	.501	0.818	0.761	0.774	0.797	0.823	0.605	0.629	0.829	0.786	0.871	0.911
DCP13	.600	0.669	0.765	0.677	0.625	0.668	0.667	0.751	0.733	0.742	0.771	0.763
DCP14	.701	0.541	0.632	0.668	0.667	0.690	0.691	0.715	0.642	0.700	0.663	0.686
DCP15	.800	0.481	0.483	0.536	0.488	0.491	0.584	0.513	0.547	0.532	0.534	0.631
DCP16	.900	0.231	0.216	0.245	0.211	0.227	0.253	0.195	0.232	0.241	0.246	0.234
DCP17	.969	0.030	-0.026	-0.073	-0.050	-0.012	0.007	-0.064	-0.091	-0.018	0.035	-0.054

ALPHA		15.071	14.716	15.123	15.771	15.694	15.871	16.370	16.575	16.706	16.620	16.763
CN		1.054	1.055	1.079	1.087	1.109	1.102	1.122	1.117	1.129	1.090	1.119
CM		-0.067	-0.069	-0.069	-0.072	-0.083	-0.077	-0.060	-0.092	-0.085	-0.094	-0.098
DCP 1	.010	2.964	3.076	3.160	3.244	3.173	3.174	3.240	3.261	3.265	3.245	3.258
DCP 2	.020	3.039	3.056	3.120	3.183	3.142	3.128	3.180	3.222	3.224	3.138	2.931
DCP 3	.030	2.926	2.937	2.992	3.043	3.011	3.012	3.045	3.014	3.049	2.928	1.998
DCP 4	.049	2.781	2.747	2.810	2.831	2.614	2.601	2.841	2.384	2.832	2.011	2.344
DCP 5	.074	2.733	2.689	2.744	2.711	2.696	2.751	2.723	2.295	2.721	1.952	2.315
DCP 6	.099	2.520	2.462	2.517	2.508	2.501	2.526	2.529	2.177	2.548	1.627	2.251
DCP 7	.149	2.336	2.339	2.396	2.435	2.418	2.422	2.451	2.060	2.106	1.722	2.075
DCP 8	.200	1.263	1.163	1.240	1.171	1.250	1.249	1.300	1.406	1.365	1.464	1.769
DCP 9	.250	1.153	1.144	1.139	1.140	1.224	1.192	1.223	1.453	1.251	1.548	1.345
DCP10	.300	1.064	1.081	1.087	1.103	1.114	1.136	1.131	1.315	1.174	1.453	1.257
DCP11	.399	0.968	0.999	1.068	0.949	1.076	1.093	1.120	1.152	1.101	1.241	1.138
DCP12	.501	0.902	0.847	0.893	0.916	0.898	0.892	0.913	1.035	0.959	1.052	1.021
DCP13	.600	0.719	0.754	0.601	0.842	0.757	0.770	0.835	0.849	0.840	0.962	0.900
DCP14	.701	0.619	0.790	0.710	0.769	0.619	0.717	0.775	0.797	0.807	0.777	0.824
DCP15	.800	0.626	0.572	0.585	0.577	0.639	0.640	0.619	0.635	0.684	0.591	0.683
DCP16	.900	0.290	0.258	0.256	0.250	0.330	0.346	0.325	0.275	0.334	0.213	0.307
DCP17	.969	-0.023	-0.052	-0.036	-0.059	0.043	-0.016	-0.028	-0.002	0.010	-0.121	-0.088

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.702 Rn = 10.0 x 10^6

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ALPHA            17.428    17.930    17.723    17.631    18.113    18.566    18.714    18.925    18.634    19.393    19.427
CN                1.126     1.125     1.156     1.136     1.124     1.163     1.180     1.164     1.158     1.190     1.219
CM               -0.114    -0.111    -0.112    -0.114    -0.119    -0.132    -0.137    -0.131    -0.128    -0.136    -0.148

DCP 1    .010     3.126     3.325     3.294     3.274     3.345     3.284     3.316     3.321     3.284     3.063     3.069
DCP 2    .020     3.099     3.017     2.973     2.998     3.115     2.948     3.156     3.144     3.056     2.659     2.498
DCP 3    .030     3.035     2.692     1.981     2.025     2.741     2.843     2.767     2.843     2.666     2.629     2.647
DCP 4    .049     1.892     1.843     2.365     2.179     1.825     1.804     1.803     1.814     1.847     1.636     1.863
DCP 5    .074     1.630     1.781     2.320     2.136     1.735     1.741     1.726     1.755     1.754     1.742     1.776
DCP 6    .099     1.730     1.711     2.249     2.052     1.617     1.634     1.651     1.677     1.673     1.676     1.708
DCP 7    .149     1.662     1.565     2.028     1.966     1.492     1.563     1.544     1.522     1.557     1.557     1.593
DCP 8    .200     1.597     1.498     1.826     1.805     1.357     1.375     1.411     1.427     1.461     1.495     1.516
DCP 9    .250     1.665     1.723     1.364     1.387     1.577     1.652     1.597     1.526     1.643     1.792     1.782
DCP10    .300     1.452     1.666     1.284     1.305     1.674     1.648     1.755     1.735     1.665     1.721     1.747
DCP11    .399     1.257     1.456     1.197     1.216     1.444     1.438     1.530     1.460     1.468     1.465     1.476
DCP12    .501     1.078     1.036     1.061     1.054     1.120     1.216     1.207     1.168     1.166     1.229     1.258
DCP13    .600     0.978     0.869     0.934     0.929     0.951     1.021     1.024     1.001     0.903     1.066     1.091
DCP14    .701     0.869     0.816     0.854     0.844     0.850     0.895     0.873     0.864     0.855     0.846     0.914
DCP15    .800     0.679     0.669     0.740     0.716     0.674     0.712     0.727     0.721     0.754     0.746     0.793
DCP16    .900     0.295     0.270     0.368     0.374     0.263     0.323     0.350     0.349     0.336     0.343     0.366
DCP17    .969    -0.052    -0.027     0.016     0.001    -0.025     0.013     0.079     0.018     0.006     0.094     0.130


ALPHA            19.533    19.538    19.644    19.736    19.592
CN                1.246     1.210     1.206     1.207     1.207
CM               -0.157    -0.144    -0.143    -0.145    -0.143

DCP 1    .010     3.195     3.062     3.055     3.063     2.921
DCP 2    .020     3.077     2.963     2.934     2.867     2.837
DCP 3    .030     2.850     2.862     2.778     2.736     2.610
DCP 4    .049     1.871     1.855     1.853     1.850     1.874
DCP 5    .074     1.776     1.793     1.792     1.778     1.763
DCP 6    .099     1.706     1.705     1.716     1.700     1.714
DCP 7    .149     1.624     1.607     1.620     1.557     1.602
DCP 8    .200     1.465     1.464     1.491     1.514     1.519
DCP 9    .250     1.675     1.761     1.736     1.792     1.826
DCP10    .300     1.774     1.763     1.711     1.735     1.663
DCP11    .399     1.543     1.518     1.442     1.491     1.478
DCP12    .501     1.303     1.218     1.241     1.204     1.218
DCP13    .600     1.122     1.019     1.059     1.056     1.035
DCP14    .701     0.977     0.875     0.921     0.964     0.899
DCP15    .800     0.801     0.748     0.745     0.750     0.757
DCP16    .900     0.419     0.401     0.384     0.391     0.403
DCP17    .969     0.150     0.103     0.097     0.062     0.104
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AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.750 Rn = 10.0 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		2.145	1.478	0.874	-0.003	-0.623	-1.336	-1.894	-2.288	-2.785	-3.544	-4.215
CN		0.404	0.316	0.218	0.110	0.016	-0.076	-0.182	-0.334	-0.433	-0.505	-0.608
CM		-0.013	-0.014	-0.015	-0.021	-0.024	-0.025	-0.034	-0.037	-0.040	-0.047	-0.037
DCP 1	.010	-0.064	-0.361	-0.718	-1.145	-1.742	-1.583	-2.195	-2.345	-2.494	-2.625	-2.712
DCP 2	.020	0.343	-0.237	-0.552	-0.927	-1.372	-1.715	-1.946	-2.127	-2.336	-2.446	-2.553
DCP 3	.030	0.247	0.018	-0.256	-0.564	-1.041	-1.459	-1.658	-1.887	-2.054	-2.198	-2.314
DCP 4	.049	0.608	0.347	0.168	-0.074	-0.321	-0.995	-1.285	-1.493	-1.690	-1.625	-1.952
DCP 5	.074	0.775	0.617	0.475	0.198	-0.066	-0.510	-0.855	-1.184	-1.376	-1.533	-1.675
DCP 6	.099	0.965	0.813	0.835	0.418	0.144	0.026	-0.738	-1.035	-1.198	-1.352	-1.497
DCP 7	.149	1.013	0.875	0.895	0.315	0.092	-0.045	-0.587	-0.919	-1.045	-1.248	-1.382
DCP 8	.200	0.577	0.626	0.585	0.187	0.045	-0.258	-0.288	-0.908	-1.065	-1.207	-1.327
DCP 9	.250	0.582	0.832	0.263	0.217	0.076	-0.055	-0.087	-0.536	-1.054	-1.184	-1.302
DCP10	.300	0.945	0.561	0.303	0.225	0.103	-0.035	-0.058	-0.068	-0.525	-1.071	-1.183
DCP11	.399	0.432	0.256	0.275	0.178	0.087	0.036	-0.063	-0.039	-0.095	-0.402	-0.782
DCP12	.501	0.147	0.248	0.213	0.150	0.094	0.018	-0.046	-0.065	-0.026	-0.064	-0.252
DCP13	.600	0.239	0.236	0.221	0.167	0.134	0.286	0.033	-0.005	-0.037	0.052	0.015
DCP14	.701	0.334	0.312	0.311	0.265	0.242	0.228	0.198	0.184	0.167	0.171	0.184
DCP15	.800	0.105	0.103	0.137	0.073	0.090	0.078	0.055	0.027	0.035	0.036	0.067
DCP16	.900	-0.152	-0.162	-0.163	-0.152	-0.161	-0.153	-0.143	-0.148	-0.150	-0.136	-0.095
DCP17	.969	-0.080	-0.061	-0.068	-0.063	-0.062	-0.044	-0.036	-0.053	-0.057	-0.035	-0.032

ALPHA		-1.783	-1.174	-0.748	-0.149	0.377	1.073	1.619	6.485	7.171	7.868	8.634
CN		-0.123	-0.033	0.062	0.155	0.256	0.368	0.464	0.758	0.786	0.805	0.796
CM		-0.032	-0.028	-0.022	-0.019	-0.019	-0.015	-0.015	-0.026	-0.030	-0.036	-0.038
DCP 1	.010	-2.085	-1.864	-1.500	-0.927	-0.520	-0.179	0.104	1.513	1.626	1.796	1.900
DCP 2	.020	-1.643	-1.575	-1.079	-0.721	-0.369	-0.075	0.183	1.353	1.418	1.579	1.671
DCP 3	.030	-1.576	-1.290	-0.753	-0.411	-0.115	0.136	0.347	1.316	1.378	1.501	1.602
DCP 4	.049	-1.156	-0.581	-0.216	0.041	0.286	0.511	0.706	1.524	1.565	1.664	1.719
DCP 5	.074	-0.731	-0.311	0.022	0.273	0.490	0.689	0.855	1.649	1.685	1.781	1.819
DCP 6	.099	-0.478	0.008	0.271	0.527	0.713	0.884	1.027	1.737	1.762	1.861	1.896
DCP 7	.149	-0.053	-0.007	0.190	0.510	0.805	0.966	1.101	1.721	1.760	1.848	1.880
DCP 8	.200	-0.130	-0.036	0.119	0.230	0.755	0.911	1.078	1.671	1.706	1.687	1.615
DCP 9	.250	-0.095	0.006	0.145	0.263	0.307	0.918	1.056	1.496	1.533	1.247	1.137
DCP10	.300	-0.046	0.040	0.161	0.268	0.294	0.857	1.010	1.108	1.107	1.000	0.947
DCP11	.399	-0.025	0.054	0.154	0.229	0.308	0.254	0.717	0.757	0.776	0.833	0.745
DCP12	.501	-0.006	0.051	0.108	0.180	0.236	0.232	0.200	0.607	0.644	0.710	0.594
DCP13	.600	0.061	0.102	0.142	0.182	0.245	0.260	0.215	0.473	0.548	0.579	0.576
DCP14	.701	0.224	0.237	0.254	0.293	0.307	0.327	0.325	0.389	0.426	0.466	0.535
DCP15	.800	0.067	0.084	0.067	0.084	0.112	0.095	0.115	0.288	0.288	0.291	0.363
DCP16	.900	-0.142	-0.143	-0.147	-0.161	-0.143	-0.133	-0.134	-0.051	-0.066	0.003	0.059
DCP17	.969	-0.043	-0.035	-0.048	-0.077	-0.068	-0.075	-0.072	-0.110	-0.092	-0.105	-0.149

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.750 Rn = 10.0 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		9.054	9.437	10.087	10.703	11.247	11.861	12.512	13.217	13.904	14.267
CN		0.913	0.868	0.902	0.892	0.875	0.921	0.954	0.995	1.054	1.075
CM		-0.045	-0.048	-0.051	-0.051	-0.054	-0.067	-0.072	-0.078	-0.092	-0.095
DCP 1	.010	2.054	2.178	2.293	2.347	2.462	2.507	2.589	2.643	2.703	2.765
DCP 2	.020	1.819	1.941	2.082	2.158	2.269	2.327	2.433	2.495	2.556	2.626
DCP 3	.030	1.750	1.872	1.996	2.068	2.179	2.223	2.321	2.382	2.456	2.518
DCP 4	.049	1.815	1.911	2.018	2.073	2.171	2.208	2.299	2.349	2.420	2.477
DCP 5	.074	1.890	1.964	2.057	2.110	2.196	2.232	2.325	2.371	2.424	2.484
DCP 6	.099	1.952	2.013	2.096	2.142	2.213	2.247	2.329	2.373	2.426	2.483
DCP 7	.149	1.926	1.968	2.048	2.080	2.044	2.052	2.117	2.122	2.175	2.212
DCP 8	.200	1.878	1.516	1.657	1.486	1.086	1.118	1.120	1.200	1.223	1.256
DCP 9	.250	1.816	1.213	1.119	1.000	0.974	0.987	1.094	1.089	1.189	1.196
DCP10	.300	1.278	1.052	0.991	0.974	0.873	0.989	0.974	1.052	1.092	1.130
DCP11	.399	0.858	0.854	0.899	0.821	0.815	0.832	0.864	0.953	1.043	1.015
DCP12	.501	0.684	0.677	0.747	0.782	0.756	0.778	0.749	0.845	0.905	0.926
DCP13	.600	0.593	0.581	0.609	0.623	0.603	0.686	0.709	0.721	0.794	0.825
DCP14	.701	0.561	0.572	0.607	0.600	0.589	0.632	0.667	0.700	0.759	0.735
DCP15	.800	0.447	0.454	0.488	0.469	0.506	0.544	0.607	0.617	0.655	0.688
DCP16	.900	0.055	0.152	0.152	0.177	0.221	0.288	0.307	0.320	0.354	0.402
DCP17	.969	-0.180	-0.187	-0.203	-0.179	-0.149	-0.068	-0.046	-0.044	0.045	0.048

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.797 Rn = 10.5 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		-1.687	-1.062	-0.507	-0.045	0.614	1.098	1.721	2.341	3.143	3.836	4.234
CN		-0.131	-0.012	0.105	0.221	0.332	0.416	0.455	0.479	0.478	0.505	0.495
CM		-0.035	-0.031	-0.029	-0.028	-0.035	-0.040	-0.039	-0.031	-0.018	-0.015	0.001
DCP 1	.010	-1.831	-1.668	-1.423	-0.981	-0.675	-0.428	-0.258	-0.064	0.097	0.278	0.420
DCP 2	.020	-1.592	-1.400	-1.033	-0.813	-0.543	-0.312	-0.163	0.022	0.160	0.313	0.435
DCP 3	.030	-1.366	-1.165	-0.881	-0.512	-0.282	-0.095	0.035	0.186	0.309	0.443	0.539
DCP 4	.049	-0.969	-0.711	-0.183	-0.048	0.123	0.286	0.394	0.524	0.619	0.739	0.830
DCP 5	.074	-0.479	-0.352	-0.136	0.137	0.312	0.459	0.554	0.668	0.756	0.877	0.963
DCP 6	.099	-0.348	-0.113	0.234	0.419	0.562	0.676	0.747	0.843	0.923	1.018	1.097
DCP 7	.149	-0.333	0.080	0.335	0.517	0.654	0.761	0.831	0.922	0.982	1.067	1.127
DCP 8	.200	-0.393	0.016	0.314	0.505	0.618	0.734	0.802	0.896	0.955	1.033	1.089
DCP 9	.250	-0.398	0.029	0.283	0.519	0.638	0.735	0.802	0.887	0.942	1.027	1.078
DCP10	.300	-0.333	0.078	0.189	0.513	0.628	0.730	0.795	0.869	0.917	0.987	1.046
DCP11	.399	0.124	0.074	0.162	0.497	0.637	0.728	0.778	0.850	0.895	0.964	0.993
DCP12	.501	0.091	0.092	0.217	0.237	0.624	0.712	0.749	0.807	0.844	0.661	0.377
DCP13	.600	0.131	0.146	0.202	0.152	0.416	0.763	0.802	0.563	0.215	0.201	0.204
DCP14	.701	0.270	0.299	0.326	0.324	0.184	0.148	0.179	0.146	0.145	0.169	0.181
DCP15	.800	0.056	0.061	0.066	0.072	0.045	-0.001	-0.019	-0.001	0.032	0.078	0.104
DCP16	.900	-0.159	-0.151	-0.168	-0.159	-0.169	-0.196	-0.208	-0.185	-0.211	-0.201	-0.196
DCP17	.969	-0.059	-0.047	-0.057	-0.056	-0.071	-0.086	-0.118	-0.113	-0.120	-0.114	-0.364

ALPHA		4.728	5.358	5.907	6.476	7.289	7.851	8.514	8.992	9.601	10.150	10.777
CN		0.530	0.576	0.628	0.679	0.735	0.801	0.865	0.951	1.026	1.099	1.197
CM		0.001	-0.006	-0.018	-0.025	-0.041	-0.053	-0.069	-0.093	-0.110	-0.130	-0.161
DCP 1	.010	0.574	0.728	0.846	1.045	1.074	1.257	1.387	1.530	1.654	1.781	1.880
DCP 2	.020	0.571	0.709	0.810	0.950	1.039	1.159	1.248	1.331	1.454	1.573	1.683
DCP 3	.030	0.651	0.765	0.838	0.963	1.038	1.131	1.219	1.291	1.390	1.509	1.612
DCP 4	.049	0.924	1.027	1.086	1.186	1.242	1.322	1.388	1.448	1.523	1.588	1.668
DCP 5	.074	1.047	1.143	1.208	1.300	1.343	1.438	1.496	1.545	1.610	1.667	1.730
DCP 6	.099	1.168	1.262	1.295	1.405	1.442	1.518	1.581	1.625	1.691	1.736	1.783
DCP 7	.149	1.202	1.275	1.322	1.408	1.440	1.515	1.565	1.611	1.670	1.720	1.761
DCP 8	.200	1.148	1.219	1.271	1.347	1.390	1.459	1.513	1.553	1.610	1.655	1.701
DCP 9	.250	1.138	1.205	1.241	1.322	1.359	1.427	1.471	1.513	1.566	1.611	1.651
DCP10	.300	1.092	1.160	1.194	1.261	1.303	1.358	1.406	1.444	1.492	1.540	1.571
DCP11	.399	1.056	1.013	1.081	1.059	1.154	1.247	1.332	1.387	1.434	1.478	1.518
DCP12	.501	0.348	0.395	0.448	0.497	0.548	0.606	0.698	0.986	1.240	1.368	1.408
DCP13	.600	0.221	0.273	0.324	0.373	0.433	0.506	0.554	0.628	0.694	0.818	1.305
DCP14	.701	0.210	0.239	0.296	0.336	0.390	0.441	0.515	0.582	0.641	0.716	0.792
DCP15	.800	0.135	0.191	0.243	0.268	0.319	0.392	0.440	0.532	0.582	0.651	0.720
DCP16	.900	-0.145	-0.125	-0.063	-0.027	0.053	0.090	0.157	0.243	0.288	0.352	0.425
DCP17	.969	-0.475	-0.433	-0.393	-0.335	-0.272	-0.241	-0.163	-0.083	-0.031	0.040	0.117

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.797 Rn = 10.5 x 10^6 FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		11.200	12.076	12.639	13.217	13.783
CN		1.280	1.437	1.524	1.563	1.608
CM		-0.186	-0.258	-0.293	-0.300	-0.308
DCP 1	.010	2.010	2.070	2.127	2.237	2.291
DCP 2	.020	1.801	1.888	1.985	2.062	2.156
DCP 3	.030	1.727	1.812	1.906	1.984	2.072
DCP 4	.049	1.754	1.813	1.893	1.963	2.042
DCP 5	.074	1.803	1.859	1.932	1.990	2.060
DCP 6	.099	1.845	1.896	1.959	2.013	2.078
DCP 7	.149	1.811	1.852	1.909	1.958	2.018
DCP 8	.200	1.760	1.797	1.848	1.894	1.948
DCP 9	.250	1.705	1.746	1.795	1.837	1.890
DCP10	.300	1.624	1.656	1.706	1.745	1.792
DCP11	.399	1.566	1.601	1.648	1.685	1.731
DCP12	.501	1.454	1.490	1.533	1.566	1.615
DCP13	.600	1.398	1.432	1.470	1.503	1.543
DCP14	.701	1.026	1.408	1.444	1.473	1.506
DCP15	.800	0.786	1.405	1.495	1.516	1.553
DCP16	.900	0.510	0.753	1.218	1.251	1.275
DCP17	.969	0.209	0.406	0.456	0.517	0.543

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.800 Rn = 10.5 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		1.626	1.052	0.557	-0.253	-0.983	-1.486	-2.193	-2.558	-4.695	-5.139	-5.930
CN		0.425	0.365	0.260	0.158	0.028	-0.079	-0.231	-0.346	-0.523	-0.550	-0.537
CM		-0.039	-0.038	-0.027	-0.028	-0.030	-0.034	-0.031	-0.026	-0.003	-0.012	-0.030
DCP 1	.010	-0.425	-0.637	-0.900	-1.293	-1.609	-1.775	-1.956	-2.065	-2.239	-2.377	-2.425
DCP 2	.020	-0.252	-0.450	-0.687	-0.938	-1.271	-1.510	-1.680	-1.838	-2.049	-2.185	-2.238
DCP 3	.030	-0.050	-0.216	-0.416	-0.760	-1.019	-1.287	-1.470	-1.624	-1.837	-1.989	-2.049
DCP 4	.049	0.323	0.176	0.024	-0.156	-0.563	-0.868	-1.073	-1.235	-1.471	-1.625	-1.687
DCP 5	.074	0.485	0.354	0.204	-0.049	-0.264	-0.417	-0.573	-0.778	-1.131	-1.311	-1.392
DCP 6	.099	0.697	0.592	0.475	0.308	0.014	-0.251	-0.484	-0.726	-1.013	-1.177	-1.246
DCP 7	.149	0.781	0.687	0.568	0.414	0.212	-0.249	-0.476	-0.685	-0.927	-1.082	-1.148
DCP 8	.200	0.750	0.647	0.547	0.394	0.069	-0.316	-0.546	-0.714	-0.912	-1.050	-1.101
DCP 9	.250	0.756	0.667	0.561	0.414	0.049	-0.256	-0.538	-0.696	-0.882	-1.007	-1.058
DCP10	.300	0.744	0.656	0.545	0.414	0.146	0.103	-0.466	-0.612	-0.792	-0.913	-0.962
DCP11	.399	0.736	0.662	0.565	0.380	0.108	0.072	-0.474	-0.615	-0.778	-0.894	-0.890
DCP12	.501	0.711	0.649	0.553	0.116	0.144	0.067	0.127	-0.350	-0.756	-0.307	-0.272
DCP13	.600	0.765	0.704	0.125	0.208	0.178	0.118	0.140	0.156	-0.111	-0.123	-0.133
DCP14	.701	0.196	0.137	0.227	0.325	0.311	0.283	0.276	0.296	0.123	0.094	0.065
DCP15	.800	-0.024	0.005	0.050	0.065	0.061	0.064	0.067	0.088	0.054	-0.016	0.362
DCP16	.900	-0.215	-0.204	-0.184	-0.168	-0.173	-0.160	-0.171	-0.141	-0.091	-0.104	-0.158
DCP17	.969	-0.093	-0.087	-0.061	-0.067	-0.059	-0.041	-0.057	-0.061	-0.079	-0.059	-0.056

ALPHA		-6.497	-7.072	-7.508	-8.021	-8.819	-9.433	-10.113
CN		-0.535	-0.561	-0.559	-0.602	-0.666	-0.738	-0.807
CM		-0.037	-0.036	-0.057	-0.053	-0.041	-0.025	-0.004
DCP 1	.010	-2.503	-2.573	-2.618	-2.643	-2.837	-2.781	-2.768
DCP 2	.020	-2.303	-2.369	-2.427	-2.486	-2.532	-2.593	-2.615
DCP 3	.030	-2.122	-2.178	-2.243	-2.308	-2.367	-2.437	-2.464
DCP 4	.049	-1.760	-1.836	-1.911	-1.979	-2.046	-2.113	-2.151
DCP 5	.074	-1.471	-1.549	-1.639	-1.707	-1.783	-1.858	-1.901
DCP 6	.099	-1.328	-1.400	-1.475	-1.543	-1.611	-1.686	-1.734
DCP 7	.149	-1.231	-1.304	-1.382	-1.445	-1.506	-1.570	-1.606
DCP 8	.200	-1.164	-1.227	-1.295	-1.365	-1.427	-1.489	-1.524
DCP 9	.250	-1.119	-1.183	-1.247	-1.299	-1.361	-1.415	-1.447
DCP10	.300	-1.015	-1.071	-1.084	-1.132	-1.213	-1.281	-1.327
DCP11	.399	-0.637	-0.557	-0.534	-0.582	-0.701	-0.852	-1.036
DCP12	.501	-0.303	-0.321	-0.381	-0.445	-0.506	-0.590	-0.648
DCP13	.600	-0.136	-0.173	-0.238	-0.286	-0.361	-0.433	-0.487
DCP14	.701	0.054	-0.017	-0.045	-0.106	-0.152	-0.212	-0.278
DCP15	.800	0.420	0.386	0.358	0.270	0.238	0.173	0.098
DCP16	.900	-0.157	-0.093	0.339	0.301	0.265	0.209	0.123
DCP17	.969	-0.087	-0.102	-0.064	0.162	0.100	0.045	-0.042

M = 0.849 Rn = 11.0 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		1.283	0.693	0.192	-0.481	-1.377	-1.887	-2.585	-3.070	-3.546	-4.261	-4.928
CN		0.179	0.107	0.028	-0.036	-0.120	-0.199	-0.206	-0.282	-0.329	-0.389	-0.470
CM		-0.009	0.004	0.016	0.012	0.016	0.016	-0.009	-0.015	-0.021	-0.013	0.009
DCP 1	.010	-0.835	-1.147	-1.326	-1.387	-1.526	-1.645	-1.684	-1.868	-1.911	-1.947	-2.130
DCP 2	.020	-0.682	-0.812	-0.898	-1.091	-1.227	-1.355	-1.438	-1.565	-1.651	-1.728	-1.806
DCP 3	.030	-0.429	-0.634	-0.764	-0.868	-1.010	-1.147	-1.233	-1.359	-1.439	-1.519	-1.600
DCP 4	.049	-0.021	-0.090	-0.253	-0.450	-0.582	-0.735	-0.831	-0.982	-1.071	-1.149	-1.232
DCP 5	.074	0.083	-0.016	-0.095	-0.187	-0.275	-0.319	-0.363	-0.520	-0.654	-0.787	-0.898
DCP 6	.099	0.369	0.282	0.114	0.023	-0.053	-0.155	-0.236	-0.431	-0.570	-0.684	-0.780
DCP 7	.149	0.459	0.381	0.304	0.135	0.038	-0.062	-0.164	-0.415	-0.526	-0.631	-0.725
DCP 8	.200	0.410	0.338	0.273	0.092	-0.002	-0.126	-0.312	-0.464	-0.548	-0.630	-0.706
DCP 9	.250	0.419	0.326	0.239	0.115	-0.029	-0.184	-0.308	-0.453	-0.532	-0.608	-0.682
DCP10	.300	0.434	0.348	0.258	0.202	-0.001	-0.146	-0.251	-0.360	-0.438	-0.515	-0.596
DCP11	.399	0.406	0.343	0.247	0.147	-0.033	-0.259	-0.260	-0.383	-0.471	-0.528	-0.589
DCP12	.501	0.338	0.279	0.196	0.093	-0.028	-0.217	-0.290	-0.401	-0.428	-0.482	-0.550
DCP13	.600	0.324	0.270	0.194	0.069	-0.063	-0.112	-0.203	-0.341	-0.405	-0.451	-0.502
DCP14	.701	0.330	0.281	0.225	0.146	0.060	-0.005	-0.101	-0.200	-0.247	-0.295	-0.337
DCP15	.800	-0.161	-0.274	-0.382	-0.412	-0.423	-0.316	0.197	0.405	0.027	-0.025	-0.072
DCP16	.900	-0.358	-0.467	-0.506	-0.245	-0.090	-0.021	0.016	0.096	0.552	0.400	0.147
DCP17	.969	-0.124	-0.038	-0.012	-0.018	-0.013	-0.006	0.036	0.032	0.166	0.343	0.309

ALPHA		-5.577	-6.159	-6.665	-7.137	-7.733	-8.454	-9.078	-9.631
CN		-0.548	-0.620	-0.680	-0.734	-0.795	-0.854	-0.909	-0.964
CM		0.039	0.058	0.071	0.080	0.092	0.104	0.113	0.124
DCP 1	.010	-2.100	-2.260	-2.208	-2.354	-2.433	-2.346	-2.495	-2.502
DCP 2	.020	-1.856	-1.927	-2.000	-2.069	-2.137	-2.208	-2.261	-2.322
DCP 3	.030	-1.661	-1.736	-1.814	-1.880	-1.949	-2.025	-2.094	-2.163
DCP 4	.049	-1.292	-1.375	-1.457	-1.531	-1.606	-1.686	-1.763	-1.837
DCP 5	.074	-0.985	-1.070	-1.164	-1.240	-1.333	-1.422	-1.506	-1.584
DCP 6	.099	-0.857	-0.943	-1.033	-1.107	-1.194	-1.276	-1.358	-1.438
DCP 7	.149	-0.802	-0.882	-0.960	-1.038	-1.112	-1.189	-1.264	-1.335
DCP 8	.200	-0.764	-0.832	-0.909	-0.978	-1.052	-1.129	-1.201	-1.268
DCP 9	.250	-0.734	-0.806	-0.873	-0.934	-1.005	-1.073	-1.140	-1.199
DCP10	.300	-0.645	-0.712	-0.780	-0.840	-0.908	-0.972	-1.040	-1.102
DCP11	.399	-0.632	-0.692	-0.748	-0.808	-0.866	-0.928	-0.990	-1.049
DCP12	.501	-0.600	-0.671	-0.727	-0.774	-0.830	-0.888	-0.941	-0.996
DCP13	.600	-0.546	-0.598	-0.650	-0.701	-0.759	-0.823	-0.877	-0.930
DCP14	.701	-0.380	-0.449	-0.518	-0.575	-0.631	-0.683	-0.723	-0.764
DCP15	.800	-0.109	-0.144	-0.171	-0.211	-0.255	-0.294	-0.337	-0.402
DCP16	.900	-0.118	-0.150	-0.200	-0.264	-0.336	-0.399	-0.435	-0.477
DCP17	.969	0.040	-0.234	-0.333	-0.304	-0.344	-0.380	-0.401	-0.426

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.849 Rn = 11.0 x 10^6

ALPHA		-1.900	-1.359	-0.668	-0.086	0.824	1.301	1.737	2.370	2.898	3.573	4.422
CN		-0.162	-0.127	-0.036	0.026	0.104	0.181	0.247	0.310	0.384	0.479	0.584
CM		0.007	0.017	0.009	0.016	0.008	-0.005	-0.018	-0.023	-0.045	-0.077	-0.113
DCP 1	.010	-1.609	-1.542	-1.391	-1.267	-1.013	-0.800	-0.623	-0.498	-0.419	-0.277	-0.032
DCP 2	.020	-1.337	-1.244	-1.099	-0.910	-0.825	-0.688	-0.540	-0.370	-0.240	-0.102	0.023
DCP 3	.030	-1.107	-1.021	-0.876	-0.770	-0.623	-0.408	-0.287	-0.145	-0.042	0.083	0.195
DCP 4	.049	-0.703	-0.591	-0.462	-0.306	-0.094	-0.005	0.089	0.215	0.309	0.398	0.485
DCP 5	.074	-0.288	-0.260	-0.179	-0.096	-0.008	0.113	0.234	0.366	0.448	0.536	0.622
DCP 6	.099	-0.122	-0.058	0.029	0.115	0.295	0.399	0.466	0.557	0.621	0.695	0.773
DCP 7	.149	-0.041	0.031	0.126	0.293	0.376	0.476	0.534	0.624	0.684	0.749	0.819
DCP 8	.200	-0.089	-0.006	0.085	0.269	0.342	0.426	0.492	0.582	0.647	0.718	0.783
DCP 9	.250	-0.148	-0.028	0.103	0.236	0.332	0.434	0.503	0.587	0.650	0.712	0.781
DCP10	.300	-0.083	-0.004	0.184	0.252	0.355	0.448	0.507	0.581	0.639	0.693	0.753
DCP11	.399	-0.201	-0.051	0.142	0.241	0.343	0.412	0.462	0.533	0.583	0.642	0.706
DCP12	.501	-0.204	-0.044	0.092	0.187	0.281	0.347	0.400	0.471	0.519	0.575	0.633
DCP13	.600	-0.082	-0.067	0.056	0.191	0.277	0.339	0.385	0.460	0.508	0.558	0.616
DCP14	.701	0.024	0.053	0.151	0.225	0.284	0.340	0.423	0.504	0.545	0.608	0.665
DCP15	.800	-0.182	-0.426	-0.435	-0.354	-0.311	-0.219	-0.072	-0.047	0.133	0.440	0.806
DCP16	.900	-0.060	-0.087	-0.159	-0.522	-0.500	-0.403	-0.265	-0.227	-0.100	0.018	0.173
DCP17	.969	0.015	-0.025	-0.036	-0.008	-0.056	-0.099	-0.307	-0.424	-0.368	-0.240	-0.153

ALPHA		4.942	5.317	5.989	6.448	7.271	7.916	8.463	8.975
CN		0.670	0.749	0.812	0.870	0.926	0.982	1.038	1.092
CM		-0.142	-0.168	-0.182	-0.191	-0.200	-0.208	-0.217	-0.225
DCP 1	.010	0.063	0.255	0.386	0.552	0.643	0.780	0.922	1.075
DCP 2	.020	0.145	0.263	0.388	0.523	0.649	0.771	0.898	1.026
DCP 3	.030	0.296	0.398	0.498	0.605	0.713	0.824	0.928	1.025
DCP 4	.049	0.577	0.662	0.756	0.845	0.934	1.024	1.114	1.201
DCP 5	.074	0.700	0.778	0.866	0.964	1.053	1.136	1.217	1.298
DCP 6	.099	0.848	0.920	0.994	1.070	1.154	1.233	1.315	1.387
DCP 7	.149	0.882	0.944	1.017	1.091	1.162	1.232	1.299	1.371
DCP 8	.200	0.844	0.899	0.968	1.038	1.108	1.179	1.248	1.317
DCP 9	.250	0.840	0.898	0.964	1.026	1.091	1.161	1.229	1.291
DCP10	.300	0.812	0.866	0.924	0.989	1.051	1.112	1.175	1.234
DCP11	.399	0.765	0.817	0.875	0.942	0.999	1.064	1.125	1.183
DCP12	.501	0.688	0.742	0.798	0.858	0.914	0.974	1.036	1.093
DCP13	.600	0.672	0.723	0.781	0.836	0.893	0.949	1.001	1.056
DCP14	.701	0.743	0.794	0.844	0.889	0.939	0.989	1.034	1.081
DCP15	.800	0.875	0.920	0.960	1.007	1.045	1.080	1.121	1.152
DCP16	.900	0.497	0.764	0.796	0.821	0.853	0.882	0.916	0.946
DCP17	.969	-0.098	0.042	0.208	0.251	0.269	0.279	0.297	0.317

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.898 Rn = 3.6 x 10^6

ALPHA		-4.757	-4.148	-3.615	-3.094	-2.258	-1.626	-0.976	-0.517	-0.074	0.721	1.276
CN		-0.460	-0.391	-0.321	-0.253	-0.180	-0.104	-0.033	0.041	0.124	0.197	0.259
CM		0.041	0.031	0.020	0.008	-0.005	-0.019	-0.032	-0.047	-0.063	-0.076	-0.085
DCP 1	.010	-1.743	-1.641	-1.552	-1.478	-1.432	-1.377	-1.288	-1.276	-1.159	-0.990	-0.778
DCP 2	.020	-1.610	-1.505	-1.413	-1.329	-1.274	-1.214	-1.157	-1.063	-0.934	-0.822	-0.719
DCP 3	.030	-1.415	-1.325	-1.241	-1.156	-1.071	-0.995	-0.918	-0.836	-0.785	-0.685	-0.510
DCP 4	.049	-1.059	-0.967	-0.867	-0.785	-0.693	-0.628	-0.528	-0.446	-0.369	-0.202	-0.082
DCP 5	.074	-0.804	-0.703	-0.599	-0.504	-0.415	-0.328	-0.245	-0.160	-0.090	-0.006	0.074
DCP 6	.099	-0.662	-0.555	-0.455	-0.361	-0.262	-0.178	-0.100	-0.004	0.062	0.119	0.215
DCP 7	.149	-0.631	-0.519	-0.409	-0.286	-0.199	-0.103	-0.033	0.049	0.140	0.262	0.347
DCP 8	.200	-0.625	-0.530	-0.424	-0.316	-0.187	-0.080	-0.003	0.052	0.133	0.282	0.345
DCP 9	.250	-0.609	-0.526	-0.443	-0.347	-0.244	-0.133	-0.045	0.017	0.158	0.244	0.306
DCP10	.300	-0.507	-0.424	-0.345	-0.271	-0.170	-0.072	0.010	0.077	0.214	0.271	0.333
DCP11	.399	-0.527	-0.452	-0.362	-0.245	-0.203	-0.116	-0.042	0.070	0.194	0.253	0.317
DCP12	.501	-0.485	-0.416	-0.343	-0.290	-0.253	-0.152	-0.035	0.091	0.163	0.222	0.278
DCP13	.600	-0.441	-0.386	-0.333	-0.266	-0.186	-0.119	-0.027	0.054	0.149	0.223	0.275
DCP14	.701	-0.321	-0.257	-0.196	-0.141	-0.077	0.003	0.062	0.119	0.186	0.248	0.315
DCP15	.800	-0.045	0.002	0.052	0.107	0.167	0.211	0.252	0.316	0.379	0.444	0.485
DCP16	.900	-0.092	-0.055	-0.007	0.035	0.090	0.140	0.181	0.215	0.273	0.320	0.352
DCP17	.969	-0.311	-0.284	-0.263	-0.225	-0.184	-0.150	-0.124	-0.088	-0.063	-0.011	0.022

ALPHA		1.900	2.660	3.179	3.720	4.313
CN		0.327	0.400	0.470	0.536	0.610
CM		-0.096	-0.109	-0.119	-0.130	-0.145
DCP 1	.010	-0.665	-0.545	-0.298	-0.146	0.026
DCP 2	.020	-0.559	-0.421	-0.268	-0.118	0.042
DCP 3	.030	-0.353	-0.202	-0.068	0.055	0.183
DCP 4	.049	0.017	0.139	0.273	0.381	0.490
DCP 5	.074	0.175	0.311	0.414	0.504	0.613
DCP 6	.099	0.341	0.444	0.538	0.616	0.704
DCP 7	.149	0.424	0.508	0.596	0.670	0.766
DCP 8	.200	0.420	0.506	0.600	0.656	0.737
DCP 9	.250	0.373	0.476	0.563	0.641	0.722
DCP10	.300	0.410	0.494	0.574	0.643	0.717
DCP11	.399	0.389	0.452	0.510	0.598	0.661
DCP12	.501	0.340	0.409	0.475	0.541	0.614
DCP13	.600	0.335	0.388	0.464	0.521	0.560
DCP14	.701	0.369	0.429	0.503	0.564	0.631
DCP15	.800	0.533	0.607	0.654	0.709	0.766
DCP16	.900	0.405	0.477	0.522	0.574	0.651
DCP17	.969	0.064	0.078	0.082	0.097	0.120

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.901 Rn = 7.2 x 10^6

FLOOR AND CEILING WITH 4.9% POROSITY

ALPHA		-0.407	-1.316	-2.126	-3.051	-4.140	-5.028	-6.238	-7.077	-7.855
CN		0.073	-0.037	-0.164	-0.283	-0.390	-0.492	-0.565	-0.662	-0.766
CM		-0.050	-0.029	-0.007	0.013	0.030	0.048	0.064	0.079	0.094
DCP 1	.010	-1.265	-1.404	-1.537	-1.805	-1.952	-1.871	-1.961	-2.088	-2.177
DCP 2	.020	-0.985	-1.159	-1.310	-1.429	-1.543	-1.673	-1.780	-1.904	-2.019
DCP 3	.030	-0.742	-0.942	-1.08	-1.206	-1.338	-1.470	-1.588	-1.729	-1.838
DCP 4	.049	-0.416	-0.570	-0.7[illegible]	-0.865	-1.004	-1.147	-1.260	-1.406	-1.522
DCP 5	.074	-0.074	-0.170	-0.313	-0.512	-0.685	-0.841	-0.988	-1.133	-1.260
DCP 6	.099	0.048	-0.029	-0.131	-0.322	-0.518	-0.695	-0.853	-1.014	-1.133
DCP 7	.149	0.111	0.004	-0.156	-0.343	-0.518	-0.671	-0.796	-0.935	-1.052
DCP 8	.200	0.127	0.006	-0.167	-0.365	-0.522	-0.655	-0.763	-0.909	-1.015
DCP 9	.250	0.081	-0.010	-0.208	-0.375	-0.506	-0.625	-0.733	-0.855	-0.960
DCP10	.300	0.118	0.012	-0.165	-0.311	-0.419	-0.543	-0.651	-0.766	-0.862
DCP11	.349	0.140	-0.006	-0.215	-0.307	-0.451	-0.556	-0.640	-0.751	-0.831
DCP12	.501	0.105	-0.067	-0.262	-0.315	-0.419	-0.518	-0.605	-0.720	-0.798
DCP13	.600	0.061	-0.052	-0.151	-0.300	-0.387	-0.464	-0.570	-0.653	-0.727
DCP14	.701	0.130	0.056	-0.074	-0.177	-0.243	-0.325	-0.452	-0.544	-0.621
DCP15	.800	0.326	0.239	0.194	0.094	0.007	-0.087	-0.135	-0.202	-0.259
DCP16	.900	0.228	0.161	0.119	0.025	-0.050	-0.104	-0.150	-0.246	-0.353
DCP17	.969	-0.069	0.136	-0.146	-0.256	-0.313	-0.386	-0.412	-0.371	-0.376

ALPHA		[illegible]	[illegible]	0.724	[illegible]	[illegible]	1.357	1.762	2.405	[illegible]	[illegible]	4.166
CN		-0.111	[illegible]	0.127	[illegible]	[illegible]	0.236	0.308	0.377	0.44[illegible]	[illegible]	0.562
CM		[illegible]	[illegible]	-0.040	[illegible]	-0.069	-0.079	-0.092	-0.103	[illegible]	[illegible]	-0.132
DCP 1	.010	-1.489	[illegible]	-1.160	[illegible]	-1.142	-0.924	-0.749	-0.606	[illegible]	[illegible]	-0.174
DCP 2	.020	-1.135	-1.145	-1.073	-0.946	-0.818	-0.751	-0.631	-0.462	-0.305	-0.151	-0.114
DCP 3	.030	-1.034	-0.754	-0.861	-0.780	-0.701	-0.585	-0.394	-0.261	-0.128	-0.003	0.020
DCP 4	.049	-0.668	-0.566	-0.451	-0.404	-0.243	-0.121	-0.026	0.091	0.205	0.314	0.412
DCP 5	.074	-0.206	-0.153	-0.395	-0.346	0.018	0.103	0.178	0.276	0.379	0.470	0.564
DCP 6	.099	-0.086	-0.038	0.024	0.053	0.131	0.190	0.305	0.421	0.509	0.590	0.679
DCP 7	.149	-0.067	0.006	0.088	0.148	0.169	0.354	0.414	0.493	0.574	0.653	0.727
DCP 8	.200	-0.041	0.008	0.070	0.121	0.266	0.320	0.401	0.471	0.554	0.631	0.702
DCP 9	.250	-0.116	-0.012	0.032	0.093	0.234	0.300	0.387	0.470	0.558	0.626	0.692
DCP10	.300	-0.088	0.009	0.068	0.124	0.248	0.313	0.402	0.488	0.552	0.616	0.678
DCP11	.349	-0.148	-0.066	0.030	0.171	0.221	0.292	0.375	0.439	0.497	0.563	0.624
DCP12	.501	-0.211	-0.073	0.077	0.110	0.160	0.249	0.321	0.380	0.444	0.507	0.562
DCP13	.600	-0.127	-0.053	0.009	0.065	0.180	0.254	0.318	0.369	0.430	0.486	0.542
DCP14	.701	0.003	0.059	0.096	0.156	0.210	0.268	0.341	0.406	0.472	0.533	0.595
DCP15	.800	0.207	0.232	0.261	0.346	0.413	0.467	0.520	0.560	0.630	0.672	0.712
DCP16	.900	0.138	0.173	0.200	0.247	0.296	0.341	0.389	0.443	0.497	0.530	0.578
DCP17	.969	-0.162	-0.133	-0.099	-0.062	-0.022	0.005	0.335	0.065	0.080	0.060	0.070

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

FLOOR AND CEILING WITH 4.9% POROSITY

M = 0.899 Rn = 11.0 x 10^6

ALPHA		-1.918	-1.337	-0.692	0.194	0.655	1.047	1.728	2.378	2.949	3.730
CN		-0.117	-0.050	0.015	0.078	0.151	0.222	0.297	0.364	0.423	0.485
CM		-0.016	-0.029	-0.041	-0.054	-0.068	-0.080	-0.093	-0.103	-0.113	-0.121
DCP 1	.010	-1.501	-1.476	-1.420	-1.357	-1.324	-1.031	-0.811	-0.562	-0.658	-0.344
DCP 2	.020	-1.268	-1.204	-1.120	-0.993	-0.855	-0.787	-0.690	-0.522	-0.373	-0.226
DCP 3	.030	-1.069	-0.998	-0.896	-0.796	-0.721	-0.635	-0.441	-0.293	-0.166	-0.040
DCP 4	.049	-0.693	-0.605	-0.514	-0.426	-0.324	-0.138	-0.050	0.058	0.160	0.270
DCP 5	.074	-0.263	-0.233	-0.201	-0.145	-0.086	-0.018	0.055	0.194	0.319	0.423
DCP 6	.099	-0.132	-0.073	-0.005	0.040	0.118	0.161	0.325	0.407	0.484	0.571
DCP 7	.149	-0.038	0.020	0.080	0.137	0.184	0.334	0.413	0.488	0.557	0.632
DCP 8	.200	-0.088	-0.014	0.048	0.106	0.240	0.299	0.370	0.451	0.526	0.603
DCP 9	.250	-0.150	-0.035	0.020	0.083	0.207	0.282	0.364	0.452	0.525	0.601
DCP10	.300	-0.099	-0.008	0.059	0.124	0.227	0.299	0.385	0.466	0.531	0.590
DCP11	.399	-0.167	-0.088	0.029	0.161	0.200	0.280	0.359	0.426	0.479	0.544
DCP12	.501	-0.225	-0.089	0.053	0.090	0.166	0.236	0.310	0.367	0.416	0.480
DCP13	.600	-0.113	-0.058	-0.017	0.064	0.170	0.240	0.311	0.359	0.412	0.472
DCP14	.701	-0.006	0.061	0.096	0.144	0.199	0.252	0.334	0.389	0.451	0.511
DCP15	.800	0.215	0.239	0.290	0.348	0.409	0.469	0.517	0.572	0.617	0.657
DCP16	.900	0.143	0.182	0.218	0.246	0.303	0.351	0.398	0.446	0.493	0.523
DCP17	.969	-0.160	-0.131	-0.099	-0.056	-0.017	0.015	0.047	0.092	0.118	0.121

ALPHA		-0.206	-1.198	-2.179	-3.204	-4.096	-4.944	-5.810	-6.617
CN		0.064	-0.037	-0.147	-0.264	-0.377	-0.472	-0.558	-0.640
CM		-0.050	-0.030	-0.012	0.010	0.028	0.044	0.059	0.071
DCP 1	.010	-1.290	-1.573	-1.633	-1.776	-1.845	-1.889	-2.020	-2.064
DCP 2	.020	-1.039	-1.168	-1.332	-1.426	-1.563	-1.676	-1.780	-1.889
DCP 3	.030	-0.830	-0.967	-1.120	-1.226	-1.350	-1.473	-1.578	-1.691
DCP 4	.049	-0.440	-0.569	-0.736	-0.851	-0.992	-1.115	-1.230	-1.350
DCP 5	.074	-0.113	-0.190	-0.253	-0.363	-0.561	-0.754	-0.904	-1.049
DCP 6	.099	0.036	-0.045	-0.144	-0.280	-0.498	-0.677	-0.815	-0.950
DCP 7	.149	0.118	0.033	-0.063	-0.306	-0.511	-0.659	-0.777	-0.693
DCP 8	.200	0.087	-0.001	-0.135	-0.358	-0.505	-0.622	-0.730	-0.846
DCP 9	.250	0.061	-0.021	-0.203	-9.365	-0.493	-0.604	-0.704	-0.810
DCP10	.300	0.098	-0.004	-0.154	-0.297	-0.400	-0.522	-0.624	-0.724
DCP11	.399	0.151	-0.072	-0.216	-0.287	-0.432	-0.533	-0.614	-0.702
DCP12	.501	0.081	-0.029	-0.249	-0.305	-0.414	-0.493	-0.580	-0.676
DCP13	.600	0.039	-0.065	-0.149	-0.269	-0.383	-0.449	-0.537	-0.614
DCP14	.701	0.128	0.063	-0.027	-0.161	-0.233	-0.303	-0.395	-0.492
DCP15	.800	0.327	0.241	0.211	0.122	0.024	-0.069	-0.124	-0.163
DCP16	.900	0.237	0.183	0.132	0.031	-0.034	-0.088	-0.125	-0.166
DCP17	.969	-0.067	-0.126	-0.182	-0.247	-0.311	-0.391	-0.444	-0.459

MEASURED DRAG COEFFICIENTS

Airfoil: NLR7223-62 Test: BSWT567

M = 0.6 Re = 10 x 10^6		M = 0.7 Re = 11 x 10^6		M = 0.75 Re = 11.4 x 10^6		M = 0.8 Re = 11.7 x 10^6	
α	C_d	α	C_d	α	C_d	α	C_d
- 2.0	0.0092	-2.06	0.0088	-2.15	0.0093	-2.04	0.0159
- 1.98	0.0081	-1.33	0.0073	-2.10	0.0108	-1.01	0.0102
- 1.91	0.0082	-1.12	0.0083	-1.6	0.0070	-1.01	0.0100
0.58	0.0077	1.01	0.0083	-1.24	0.0083	-0.03	0.0107
0.71	0.0075	1.95	0.0104	-1.01	0.0082	-0.02	0.0099
1.07	0.0069	3.12	0.01367	0.15	0.0076	0.76	0.0120
2.10	0.0070	3.95	0.0228	0.91	0.0096	0.93	0.014
2.10	0.0076	5.05	0.0416	0.96	0.0089		
3.03	0.0082			1.12	0.0099		
4.07	0.0082			1.69	0.0158		
4.11	0.0081			1.99	0.0160		
5.06	0.0118			2.72	0.0223		
5.74	0.0176			2.87	0.0255		
5.79	0.0179						
6.02	0.0179						
7.04	0.0290						
7.95	0.0453						
9.01	0.0560						
10.09	0.0803						

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

SOLID FLOOR AND CEILING

M = 0.201 Rn = 3.2 x 10^6

ALPHA		-7.887	-7.305	-6.652	-6.069	-5.505	-4.914	-4.284	-3.728	-3.102	-2.506	-1.847
CN		-0.459	-0.437	-0.469	-0.403	-0.357	-0.294	-0.252	-0.180	-0.147	-0.075	-0.022
CM		-0.044	-0.031	-0.032	-0.033	-0.032	-0.033	-0.026	-0.033	-0.025	-0.026	-0.026
DCP 1	.010	-2.418	-2.518	-5.307	-4.764	-4.360	-3.826	-3.544	-2.931	-2.504	-2.162	-1.682
DCP 2	.020	-2.362	-2.697	-3.459	-3.165	-2.860	-2.590	-2.429	-2.160	-1.835	-1.492	-1.292
DCP 3	.030	-2.218	-2.837	-2.476	-2.232	-2.034	-1.832	-1.593	-1.403	-1.123	-0.954	-0.654
DCP 4	.049	-2.737	-2.131	-2.139	-1.889	-1.733	-1.490	-1.410	-1.193	-0.579	-0.842	-0.651
DCP 5	.074	-2.026	-1.602	-1.463	-1.298	-1.207	-0.969	-0.865	-0.752	-0.633	-0.407	-0.255
DCP 6	.099	-1.451	-1.058	-1.025	-0.862	-0.740	-0.666	-0.450	-0.345	-0.240	-0.131	0.041
DCP 7	.149	-1.114	-0.928	-0.866	-0.800	-0.695	-0.570	-0.513	-0.421	-0.301	-0.152	-0.091
DCP 8	.200	-0.851	-0.700	-0.644	-0.547	-0.515	-0.378	-0.323	-0.269	-0.243	-0.115	0.009
DCP 9	.250	-0.574	-0.617	-0.568	-0.472	-0.406	-0.296	-0.305	-0.158	-0.133	-0.034	0.021
DCP10	.300	-0.453	-0.404	-0.442	-0.417	-0.352	-0.326	-0.203	-0.131	-0.087	0.008	0.036
DCP11	.399	-0.277	-0.332	-0.345	-0.269	-0.224	-0.229	-0.100	-0.150	-0.038	0.053	0.047
DCP12	.501	-0.197	-0.230	-0.281	-0.239	-0.217	-0.158	-0.156	-0.016	-0.085	0.015	0.026
DCP13	.600	-0.075	-0.096	-0.071	-0.055	-0.032	-0.005	0.035	0.129	0.083	0.121	0.174
DCP14	.701	-0.001	-0.057	-0.073	-0.032	-0.017	0.012	0.031	0.105	0.089	0.056	0.122
DCP15	.800	-0.005	-0.018	-0.029	0.034	0.037	0.056	0.039	0.042	0.038	0.060	0.046
DCP16	.900	0.036	0.009	-0.111	-0.056	-0.079	-0.045	-0.089	-0.095	-0.093	-0.051	-0.060
DCP17	.969	0.009	-0.013	0.078	-0.017	0.016	0.040	-0.082	0.011	-0.018	-0.041	0.010

ALPHA		-1.285	-0.712	-0.068	0.572	1.104	1.696	2.357	2.943	3.521	4.186	4.801
CN		0.021	0.082	0.144	0.195	0.265	0.312	0.371	0.454	0.528	0.568	0.618
CM		-0.022	-0.021	-0.023	-0.020	-0.020	-0.020	-0.018	-0.022	-0.024	-0.015	-0.016
DCP 1	.010	-1.310	-0.898	-0.577	-0.178	0.280	0.664	0.994	1.477	1.863	2.240	2.542
DCP 2	.020	-1.053	-0.705	-0.420	-0.179	0.212	0.473	0.741	1.123	1.440	1.814	1.921
DCP 3	.030	-0.501	-0.223	0.053	0.294	0.508	0.745	1.099	1.280	1.596	1.917	2.145
DCP 4	.049	-0.345	-0.259	-0.073	0.175	0.401	0.615	0.745	1.065	1.259	1.456	1.713
DCP 5	.074	-0.153	0.053	0.236	0.368	0.511	0.720	0.888	1.085	1.254	1.431	1.616
DCP 6	.099	0.192	0.256	0.474	0.614	0.747	0.832	1.062	1.201	1.320	1.534	1.627
DCP 7	.149	-0.003	0.088	0.237	0.293	0.478	0.579	0.620	0.782	0.955	1.016	1.057
DCP 8	.200	0.009	0.203	0.265	0.351	0.386	0.502	0.684	0.692	0.800	0.947	0.974
DCP 9	.250	0.114	0.150	0.233	0.301	0.467	0.448	0.502	0.633	0.678	0.716	0.789
DCP10	.300	0.096	0.085	0.178	0.303	0.328	0.379	0.468	0.565	0.619	0.689	0.698
DCP11	.399	0.082	0.207	0.187	0.209	0.331	0.321	0.361	0.480	0.557	0.534	0.622
DCP12	.501	0.046	0.084	0.153	0.157	0.218	0.206	0.228	0.320	0.389	0.374	0.471
DCP13	.600	0.143	0.251	0.249	0.252	0.305	0.333	0.351	0.348	0.443	0.473	0.464
DCP14	.701	0.152	0.195	0.161	0.198	0.183	0.210	0.269	0.291	0.374	0.331	0.342
DCP15	.800	0.069	0.058	0.110	0.117	0.143	0.154	0.170	0.207	0.223	0.197	0.205
DCP16	.900	-0.056	-0.126	-0.011	-0.045	-0.044	-0.003	-0.017	0.000	-0.040	-0.002	-0.002
DCP17	.969	-0.036	-0.029	-0.081	-0.030	-0.058	-0.014	-0.056	0.019	-0.019	-0.057	-0.035

M = 0.201 Rn = 3.2 x 10^6

SOLID FLOOR AND CEILING

ALPHA		5.351	5.960	6.575	7.194	7.748	8.380	9.013	9.610	10.164	10.773	11.381
CN		0.701	0.752	0.809	0.860	0.912	0.589	1.014	1.101	1.145	1.192	1.251
CM		-0.017	-0.018	-0.014	-0.015	-0.011	-0.009	-0.011	-0.007	-0.007	-0.004	-0.001
DCP 1	.010	2.959	3.329	3.651	4.043	4.475	4.916	5.291	5.867	5.548	5.933	6.010
DCP 2	.020	2.337	2.659	2.943	3.050	3.560	3.848	3.999	4.380	4.750	5.008	5.210
DCP 3	.030	2.426	2.626	2.822	3.134	3.368	3.672	3.846	4.152	4.405	4.609	4.925
DCP 4	.049	1.899	2.149	2.342	2.519	2.724	3.099	3.002	3.461	3.657	3.871	3.986
DCP 5	.074	1.724	1.982	2.095	2.223	2.420	2.714	2.721	2.941	3.075	3.251	3.473
DCP 6	.099	1.749	1.887	2.049	2.191	2.318	2.387	2.930	2.768	2.898	3.022	3.233
DCP 7	.149	1.291	1.359	1.460	1.537	1.662	1.831	1.818	1.964	2.117	2.255	2.354
DCP 8	.200	1.050	1.163	1.252	1.392	1.417	1.493	1.642	1.678	1.681	1.824	1.950
DCP 9	.250	0.935	1.006	1.097	1.120	1.217	1.290	1.337	1.492	1.494	1.632	1.704
DCP10	.300	0.871	0.868	1.007	0.990	1.051	1.109	1.139	1.231	1.315	1.332	1.397
DCP11	.399	0.676	0.724	0.762	0.828	0.826	0.992	0.940	1.076	1.037	1.090	1.194
DCP12	.501	0.539	0.529	0.540	0.586	0.630	0.686	0.704	0.736	0.825	0.818	0.893
DCP13	.600	0.545	0.488	0.585	0.613	0.624	0.685	0.640	0.745	0.753	0.740	0.707
DCP14	.701	0.376	0.415	0.410	0.385	0.514	0.500	0.476	0.515	0.488	0.504	0.559
DCP15	.800	0.191	0.233	0.224	0.327	0.259	0.260	0.318	0.282	0.318	0.299	0.266
DCP16	.900	0.016	0.066	0.054	0.036	-0.024	-0.002	0.035	0.005	0.001	0.051	0.031
DCP17	.969	-0.057	-0.020	-0.063	-0.094	-0.052	-0.094	-0.020	-0.049	0.019	-0.018	-0.009

ALPHA		11.572	12.537	13.173	13.812	14.384	14.972	15.547	16.743	17.570	19.126	19.702
CN		1.280	1.336	1.368	1.305	1.377	1.297	1.315	1.227	1.097	1.173	1.107
CM		-0.004	-0.006	-0.004	0.010	-0.001	-0.010	-0.066	-0.081	-0.118	-0.143	-0.114
DCP 1	.010	6.119	6.433	6.696	6.627	7.124	6.802	5.171	5.108	2.370	1.809	1.868
DCP 2	.020	5.472	5.799	6.003	5.908	6.240	5.964	4.446	4.259	2.113	1.642	1.791
DCP 3	.030	5.102	5.358	5.573	5.462	5.823	5.558	3.681	3.520	2.176	1.842	1.751
DCP 4	.049	4.220	4.340	4.481	4.255	4.324	3.993	3.935	3.683	3.065	3.564	3.586
DCP 5	.074	3.577	3.718	3.811	3.696	3.735	3.248	3.250	2.865	2.413	2.738	2.742
DCP 6	.099	3.257	3.367	3.364	3.324	3.414	2.923	2.719	2.440	1.561	2.222	2.241
DCP 7	.149	2.376	2.505	2.547	2.476	2.473	2.207	1.588	1.772	1.609	1.762	1.804
DCP 8	.200	1.971	2.011	2.054	2.089	2.122	1.994	1.873	1.655	1.445	1.343	1.374
DCP 9	.250	1.705	1.765	1.833	1.714	1.858	1.788	1.716	1.489	1.203	1.309	1.201
DCP10	.300	1.446	1.465	1.522	1.512	1.559	1.544	1.647	1.347	1.218	1.155	1.192
DCP11	.399	1.149	1.270	1.255	1.204	1.282	1.287	1.482	1.306	1.232	1.194	1.147
DCP12	.501	0.854	0.896	1.012	0.892	0.938	0.967	1.061	0.990	0.997	1.151	0.589
DCP13	.600	0.762	0.749	0.839	0.768	0.832	0.763	0.921	0.972	1.067	1.105	0.989
DCP14	.701	0.555	0.606	0.503	0.476	0.598	0.491	0.681	0.739	0.785	0.572	0.838
DCP15	.800	0.392	0.307	0.371	0.257	0.317	0.295	0.536	0.516	0.680	0.831	0.733
DCP16	.900	0.057	0.157	0.076	0.026	0.064	0.143	0.198	0.382	0.370	0.502	0.347
DCP17	.969	-0.080	-0.034	-0.024	-0.031	-0.044	-0.006	0.120	0.106	0.119	0.092	0.081

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

SOLID FLOOR AND CEILING

M = 0.301 Rn = 4.8 x 10^6

ALPHA		-9.574	-8.588	-8.371	-7.793	-7.229	-6.615	-5.573	-5.411	-4.848	-4.194	-3.575
CN		-0.637	-0.590	-0.580	-0.526	-0.494	-0.502	-0.459	-0.405	-0.351	-0.287	-0.231
CM		-0.024	-0.039	-0.027	-0.029	-0.025	-0.031	-0.027	-0.027	-0.025	-0.025	-0.023
DCP 1	.010	-3.211	-3.502	-2.301	-2.470	-2.601	-5.201	-5.021	-4.690	-4.220	-3.655	-3.172
DCP 2	.020	-2.488	-2.272	-2.456	-2.775	-2.996	-3.502	-3.271	-3.038	-2.719	-2.373	-2.164
DCP 3	.030	-2.188	-2.128	-3.396	-3.265	-2.809	-2.685	-2.486	-2.205	-2.053	-1.745	-1.539
DCP 4	.049	-1.950	-2.038	-2.365	-2.243	-2.155	-2.031	-1.869	-1.641	-1.451	-1.284	-1.120
DCP 5	.074	-1.888	-1.998	-1.846	-1.747	-1.630	-1.480	-1.347	-1.183	-1.046	-0.871	-0.690
DCP 6	.099	-1.533	-1.639	-1.505	-1.346	-1.267	-1.163	-1.053	-0.896	-0.763	-0.634	-0.462
DCP 7	.149	-1.413	-1.578	-1.278	-1.118	-1.011	-0.929	-0.834	-0.740	-0.593	-0.491	-0.408
DCP 8	.200	-1.293	-1.342	-0.963	-0.999	-0.892	-0.757	-0.677	-0.640	-0.539	-0.440	-0.347
DCP 9	.250	-1.259	-1.076	-0.968	-0.795	-0.667	-0.624	-0.563	-0.518	-0.455	-0.385	-0.268
DCP10	.300	-0.958	-0.827	-0.757	-0.591	-0.533	-0.506	-0.470	-0.376	-0.325	-0.272	-0.199
DCP11	.399	-0.663	-0.454	-0.488	-0.346	-0.325	-0.379	-0.342	-0.282	-0.240	-0.185	-0.158
DCP12	.501	-0.396	-0.274	-0.312	-0.278	-0.296	-0.307	-0.248	-0.231	-0.213	-0.128	-0.130
DCP13	.600	-0.201	-0.129	-0.198	-0.184	-0.172	-0.190	-0.150	-0.120	-0.097	-0.086	-0.034
DCP14	.701	0.003	0.031	-0.040	-0.031	-0.035	0.016	-0.003	0.018	0.048	0.057	0.097
DCP15	.800	-0.001	0.021	-0.009	-0.015	-0.011	-0.036	-0.008	-0.033	-0.009	0.005	0.025
DCP16	.900	-0.048	-0.035	-0.081	-0.072	-0.078	-0.083	-0.134	-0.101	-0.108	-0.092	-0.086
DCP17	.969	0.009	0.027	0.027	-0.001	-0.032	0.015	-0.000	0.022	-0.006	0.018	-0.040

ALPHA		-2.996	-2.416	-1.798	-1.187	-0.580	-0.030	0.636	1.248	1.810	2.409	3.067
CN		-0.171	-0.119	-0.047	0.006	0.071	0.125	0.186	0.244	0.305	0.380	0.444
CM		-0.020	-0.018	-0.020	-0.020	-0.018	-0.018	-0.017	-0.018	-0.014	-0.018	-0.015
DCP 1	.010	-2.610	-2.139	-1.721	-1.275	-0.886	-0.489	-0.134	0.288	0.748	1.085	1.489
DCP 2	.020	-1.807	-1.518	-1.172	-0.899	-0.592	-0.290	0.008	0.270	0.667	0.976	1.279
DCP 3	.030	-1.272	-1.043	-0.765	-0.537	-0.281	-0.057	0.217	0.468	0.748	1.012	1.303
DCP 4	.049	-0.863	-0.695	-0.495	-0.289	-0.042	0.135	0.334	0.559	0.769	1.005	1.207
DCP 5	.074	-0.567	-0.379	-0.166	-0.040	0.115	0.303	0.466	0.631	0.796	1.010	1.182
DCP 6	.099	-0.324	-0.195	-0.067	0.079	0.209	0.346	0.527	0.659	0.808	0.932	1.120
DCP 7	.149	-0.262	-0.186	-0.057	0.012	0.165	0.268	0.376	0.463	0.581	0.725	0.818
DCP 8	.200	-0.267	-0.178	-0.077	0.021	0.080	0.209	0.279	0.368	0.414	0.567	0.668
DCP 9	.250	-0.219	-0.148	-0.030	0.001	0.110	0.180	0.264	0.286	0.395	0.501	0.581
DCP10	.300	-0.136	-0.091	-0.001	0.051	0.143	0.170	0.252	0.319	0.387	0.469	0.541
DCP11	.399	-0.105	-0.052	-0.002	0.050	0.117	0.152	0.189	0.259	0.326	0.362	0.445
DCP12	.501	-0.078	-0.040	0.005	0.037	0.085	0.104	0.166	0.188	0.250	0.267	0.327
DCP13	.600	-0.025	0.006	0.040	0.073	0.126	0.122	0.167	0.165	0.230	0.278	0.304
DCP14	.701	0.104	0.110	0.166	0.190	0.194	0.220	0.237	0.259	0.272	0.303	0.364
DCP15	.800	0.056	0.048	0.062	0.066	0.098	0.114	0.130	0.151	0.152	0.177	0.178
DCP16	.900	-0.121	-0.114	-0.087	-0.061	-0.107	-0.061	-0.094	-0.038	-0.085	-0.005	-0.073
DCP17	.969	-0.010	-0.006	-0.019	-0.040	-0.023	-0.028	-0.004	-0.020	-0.042	-0.030	-0.024

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.301 Rn = 4.8 x 10^6

SOLID FLOOR AND CEILING

ALPHA		3.628	4.230	4.856	5.501	6.035	6.638	7.341	7.857	8.460	9.042	9.670
CN		0.500	0.552	0.618	0.682	0.745	0.797	0.862	0.912	0.568	1.028	1.081
CM		-0.014	-0.011	-0.010	-0.009	-0.011	-0.008	-0.008	-0.006	-0.002	-0.001	-0.002
DCP 1	.010	1.893	2.252	2.640	3.041	3.430	3.804	4.198	4.707	5.122	5.388	5.542
DCP 2	.020	1.583	1.921	2.220	2.501	2.829	3.119	3.469	3.738	4.131	4.373	4.600
DCP 3	.030	1.584	1.814	2.111	2.412	2.583	2.842	3.162	3.395	3.670	3.908	4.146
DCP 4	.049	1.454	1.674	1.853	2.139	2.355	2.553	2.757	2.581	3.237	3.405	3.572
DCP 5	.074	1.323	1.524	1.683	1.895	2.016	2.218	2.408	2.558	2.710	2.934	3.065
DCP 6	.099	1.298	1.378	1.537	1.720	1.840	1.942	2.152	2.262	2.396	2.551	2.681
DCP 7	.149	0.933	1.044	1.191	1.242	1.382	1.511	1.607	1.687	1.838	1.932	1.993
DCP 8	.200	0.719	0.822	0.935	1.041	1.107	1.219	1.262	1.365	1.406	1.557	1.648
DCP 9	.250	0.660	0.717	0.798	0.892	0.575	1.035	1.114	1.171	1.271	1.338	1.426
DCP10	.300	0.599	0.661	0.715	0.782	0.845	0.920	0.970	1.045	1.099	1.158	1.200
DCP11	.399	0.496	0.555	0.616	0.655	0.732	0.748	0.791	0.823	0.862	0.932	1.017
DCP12	.501	0.362	0.359	0.461	0.462	0.530	0.546	0.623	0.635	0.665	0.721	0.776
DCP13	.600	0.331	0.357	0.374	0.449	0.445	0.480	0.519	0.553	0.596	0.580	0.605
DCP14	.701	0.349	0.370	0.377	0.417	0.449	0.447	0.477	0.465	0.490	0.508	0.521
DCP15	.800	0.186	0.188	0.205	0.217	0.243	0.258	0.271	0.249	0.270	0.301	0.295
DCP16	.900	-0.050	-0.046	-0.042	-0.054	-0.025	-0.050	-0.018	0.026	-0.022	-0.046	-0.011
DCP17	.969	-0.012	-0.026	-0.042	-0.033	-0.047	-0.006	-0.050	-0.036	-0.051	-0.018	-0.030

ALPHA		10.274	10.865	11.447	12.124	12.626	13.226	13.818	14.505	15.011	15.641	16.245
CN		1.125	1.172	1.202	1.251	1.267	1.268	1.196	1.234	1.170	1.127	1.227
CM		0.003	0.004	0.007	0.007	0.009	0.011	0.003	-0.005	-0.074	-0.066	-0.070
DCP 1	.010	5.559	6.355	6.779	7.273	7.692	7.777	[illegible]	6.659	4.798	4.681	4.840
DCP 2	.020	4.900	5.147	5.305	5.443	5.520	5.794	5.662	5.338	4.097	4.205	4.189
DCP 3	.030	4.402	4.645	4.804	5.025	5.094	5.232	5.081	4.725	3.675	3.775	3.166
DCP 4	.049	3.805	3.581	4.090	4.228	4.359	4.358	3.901	4.176	3.287	3.257	3.601
DCP 5	.074	3.188	3.357	3.472	3.590	3.603	3.641	3.178	3.461	2.536	2.425	2.901
DCP 6	.099	2.816	2.940	2.578	3.141	3.184	3.120	2.736	2.995	2.129	2.036	2.399
DCP 7	.149	2.116	2.258	2.284	2.325	2.384	2.400	2.192	2.206	1.694	1.674	2.005
DCP 8	.200	1.692	1.743	1.842	1.876	1.901	1.944	1.814	1.912	1.503	1.512	1.797
DCP 9	.250	1.468	1.534	1.591	1.628	1.692	1.645	1.637	1.607	1.559	1.408	1.606
DCP10	.300	1.269	1.331	1.333	1.391	1.421	1.420	1.380	1.433	1.385	1.404	1.483
DCP11	.399	1.036	1.035	1.070	1.125	1.118	1.110	1.125	1.122	1.318	1.172	1.230
DCP12	.501	0.799	0.793	0.813	0.884	0.856	0.816	0.846	0.884	1.040	1.011	1.045
DCP13	.600	0.629	0.625	0.654	0.677	0.649	0.665	0.620	0.664	0.884	0.808	0.929
DCP14	.701	0.522	0.572	0.544	0.550	0.518	0.548	0.454	0.485	0.724	0.692	0.737
DCP15	.800	0.285	0.295	0.299	0.279	0.293	0.272	0.259	0.312	0.524	0.472	0.463
DCP16	.900	-0.013	0.008	0.000	0.014	0.056	0.042	0.083	0.119	0.194	0.242	0.192
DCP17	.969	-0.059	-0.061	-0.053	-0.016	-0.001	-0.015	0.039	0.051	0.069	0.039	0.140

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.301 Rn = 4.8 x 10^6 SOLID FLOOR AND CEILING

ALPHA		16.852	17.410	18.003	18.617	19.242	19.792
CN		1.007	1.003	1.038	0.966	1.011	0.990
CM		-0.101	-0.091	-0.090	-0.095	-0.102	-0.093
DCP 1	.010	4.031	3.909	3.914	3.568	3.615	3.725
DCP 2	.020	3.691	3.642	3.662	3.389	3.262	3.289
DCP 3	.030	3.789	3.666	3.091	3.322	2.934	2.065
DCP 4	.049	2.034	2.087	2.497	1.858	1.909	2.229
DCP 5	.074	1.414	1.455	1.768	1.430	1.546	1.751
DCP 6	.099	1.315	1.428	1.628	1.371	1.470	1.643
DCP 7	.149	1.205	1.318	1.496	1.254	1.391	1.490
DCP 8	.200	1.215	1.231	1.422	1.253	1.363	1.382
DCP 9	.250	1.276	1.285	1.368	1.272	1.351	1.265
DCP10	.300	1.174	1.258	1.250	1.202	1.244	1.192
DCP11	.399	1.149	1.188	1.124	1.103	1.097	1.091
DCP12	.501	1.060	1.029	0.955	0.912	1.080	0.558
DCP13	.600	0.917	0.816	0.830	0.831	0.895	0.785
DCP14	.701	0.787	0.710	0.736	0.741	0.696	0.686
DCP15	.800	0.543	0.495	0.528	0.534	0.550	0.568
DCP16	.900	0.244	0.264	0.290	0.257	0.302	0.290
DCP17	.969	0.104	0.100	0.112	0.123	0.121	0.094

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.400 Rn = 2.3 x 10^6

SOLID FLOOR AND CEILING

DATA TYPE	X/C											
ALPHA		-8.284	-7.801	-7.278	-6.785	-6.234	-5.727	-5.209	-4.697	-4.145	-3.661	-3.107
CN		-0.595	-0.567	-0.542	-0.503	-0.462	-0.448	-0.395	-0.372	-0.303	-0.245	-0.194
CM		-0.010	-0.016	-0.027	-0.036	-0.046	-0.036	-0.036	-0.034	-0.029	-0.027	-0.020
DCP 1	.010	-2.265	-2.365	-2.194	-2.263	-2.362	-2.477	-2.569	-3.293	-3.663	-3.220	-2.740
DCP 2	.020	-2.293	-2.401	-2.211	-2.313	-2.366	-2.427	-2.440	-2.800	-2.473	-2.084	-1.759
DCP 3	.030	-2.294	-2.491	-1.958	-1.965	-2.007	-2.051	-2.188	-2.246	-1.802	-1.597	-1.354
DCP 4	.049	-1.763	-1.758	-1.863	-1.960	-2.053	-2.032	-2.081	-2.023	-1.334	-1.197	-0.989
DCP 5	.074	-1.565	-1.559	-1.707	-1.792	-1.865	-1.768	-1.715	-1.554	-0.977	-0.763	-0.616
DCP 6	.099	-1.326	-1.365	-1.465	-1.540	-1.580	-1.509	-1.214	-1.019	-0.656	-0.553	-0.355
DCP 7	.149	-1.357	-1.393	-1.414	-1.364	-1.455	-1.273	-0.958	-0.690	-0.637	-0.519	-0.398
DCP 8	.200	-1.129	-1.125	-1.137	-1.017	-0.869	-0.724	-0.556	-0.454	-0.430	-0.333	-0.216
DCP 9	.250	-1.065	-1.047	-1.009	-0.834	-0.695	-0.600	-0.436	-0.441	-0.406	-0.337	-0.257
DCP10	.300	-0.919	-0.877	-0.767	-0.694	-0.497	-0.467	-0.409	-0.357	-0.341	-0.268	-0.179
DCP11	.349	-0.651	-0.583	-0.516	-0.361	-0.345	-0.333	-0.255	-0.257	-0.226	-0.149	-0.120
DCP12	.501	-0.347	-0.394	-0.278	-0.277	-0.160	-0.163	-0.208	-0.175	-0.156	-0.109	-0.102
DCP13	.600	-0.226	-0.200	-0.131	-0.101	-0.064	-0.070	-0.054	-0.064	-0.048	-0.006	-0.045
DCP14	.701	-0.078	-0.026	0.001	0.051	0.077	0.001	0.022	0.024	0.075	0.069	0.060
DCP15	.800	0.010	0.010	0.092	0.074	0.083	0.082	0.074	0.068	0.092	0.076	0.060
DCP16	.900	-0.093	-0.090	-0.065	-0.067	-0.055	-0.073	-0.062	-0.113	-0.117	-0.101	-0.103
DCP17	.969	-0.052	-0.038	-0.088	-0.014	0.031	-0.019	-0.024	-0.001	-0.031	-0.044	-0.030

DATA TYPE	X/C											
ALPHA		-2.584	-2.071	-1.534	-1.014	-0.486	0.073	0.554	1.092	1.636	2.137	2.649
CN		-0.133	-0.073	-0.008	0.045	0.113	0.171	0.214	0.262	0.345	0.404	0.453
CM		-0.023	-0.020	-0.019	-0.018	-0.020	-0.017	-0.008	-0.012	-0.013	-0.008	-0.003
DCP 1	.010	-2.192	-1.760	-1.334	-0.896	-0.514	-0.121	0.317	0.678	1.077	1.443	1.672
DCP 2	.020	-1.534	-1.445	-1.074	-0.754	-0.462	-0.214	0.122	0.439	0.742	1.006	1.380
DCP 3	.030	-1.092	-0.834	-0.607	-0.349	-0.068	0.175	0.444	0.683	0.945	1.235	1.518
DCP 4	.049	-0.603	-0.577	-0.413	-0.156	0.006	0.263	0.457	0.663	0.881	1.099	1.331
DCP 5	.074	-0.462	-0.260	-0.047	0.034	0.228	0.398	0.547	0.754	0.936	1.106	1.254
DCP 6	.099	-0.254	-0.069	0.095	0.212	0.336	0.489	0.672	0.760	0.934	1.153	1.237
DCP 7	.149	-0.240	-0.151	-0.057	0.033	0.173	0.269	0.368	0.493	0.592	0.741	0.854
DCP 8	.200	-0.162	-0.049	0.056	0.107	0.244	0.305	0.413	0.463	0.572	0.668	0.757
DCP 9	.250	-0.203	-0.056	0.025	0.042	0.159	0.217	0.276	0.396	0.462	0.539	0.563
DCP10	.300	-0.137	-0.062	0.029	0.077	0.136	0.237	0.281	0.338	0.364	0.491	0.533
DCP11	.349	-0.054	-0.034	0.045	0.088	0.126	0.223	0.250	0.314	0.345	0.381	0.459
DCP12	.501	-0.042	-0.031	0.031	0.059	0.122	0.143	0.173	0.217	0.305	0.337	0.332
DCP13	.600	0.037	0.072	0.066	0.158	0.180	0.216	0.200	0.239	0.256	0.249	0.324
DCP14	.701	0.123	0.127	0.136	0.163	0.170	0.193	0.200	0.225	0.264	0.310	0.301
DCP15	.800	0.033	0.114	0.127	0.115	0.163	0.127	0.130	0.147	0.179	0.149	0.157
DCP16	.900	-0.061	-0.112	-0.094	-0.115	-0.073	-0.111	-0.137	-0.071	-0.078	-0.090	-0.131
DCP17	.969	-0.072	-0.061	-0.053	-0.046	-0.065	-0.018	-0.060	-0.078	-0.069	-0.072	-0.064

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.400 Rn = 2.3×10^6

SOLID FLOOR AND CEILING

DATA TYPE	X/C											
ALPHA		3.169	3.708	4.237	4.722	5.286	5.792	6.287	6.818	7.369	7.848	8.391
CN		0.530	0.594	0.651	0.717	0.768	0.824	0.861	0.914	0.950	1.009	1.030
CM		-0.009	-0.004	-0.003	-0.004	-0.003	0.002	0.006	0.008	0.013	0.014	0.016
DCP 1	.010	2.248	2.654	3.021	3.424	3.744	4.205	4.566	5.047	5.591	6.021	6.257
DCP 2	.020	1.711	2.023	2.267	2.663	2.870	3.328	3.794	3.894	4.205	5.151	5.673
DCP 3	.030	1.777	2.092	2.334	2.631	2.905	3.052	3.213	3.459	3.597	3.761	4.023
DCP 4	.049	1.573	1.757	1.956	2.259	2.450	2.663	2.659	3.072	3.214	3.361	3.436
DCP 5	.074	1.453	1.645	1.795	2.022	2.157	2.377	2.478	2.644	2.761	2.921	2.956
DCP 6	.099	1.410	1.561	1.775	1.864	2.016	2.205	2.271	2.393	2.523	2.620	2.675
DCP 7	.149	0.937	1.324	1.150	1.300	1.368	1.505	1.597	1.676	1.762	1.846	1.876
DCP 8	.200	0.873	0.976	1.071	1.168	1.213	1.336	1.372	1.485	1.495	1.554	1.649
DCP 9	.250	0.721	0.731	0.876	0.937	1.032	1.102	1.135	1.201	1.250	1.327	1.374
DCP10	.300	0.551	0.674	0.753	0.760	0.823	0.936	0.972	1.025	1.076	1.112	1.108
DCP11	.399	0.513	0.583	0.632	0.660	0.722	0.764	0.810	0.834	0.875	0.943	0.930
DCP12	.501	0.361	0.437	0.468	0.501	0.579	0.570	0.603	0.635	0.627	0.665	0.704
DCP13	.600	0.317	0.377	0.349	0.433	0.472	0.492	0.465	0.531	0.519	0.545	0.532
DCP14	.701	0.337	0.364	0.338	0.404	0.394	0.419	0.372	0.424	0.444	0.435	0.427
DCP15	.800	0.234	0.204	0.208	0.242	0.240	0.246	0.225	0.197	0.243	0.202	0.184
DCP16	.900	-0.083	-0.057	-0.062	-0.060	-0.054	-0.067	-0.059	-0.058	-0.096	-0.026	-0.035
DCP17	.964	-0.042	-0.038	-0.094	-0.037	-0.086	-0.047	-0.061	-0.073	-0.105	-0.065	-0.059

DATA TYPE	X/C											
ALPHA		8.891	9.426	9.917	10.446	10.957	11.511	12.008	12.543	13.067	13.598	14.061
CN		1.063	1.057	1.004	1.015	1.006	0.998	0.981	0.961	0.926	0.933	0.942
CM		0.018	0.018	-0.009	-0.014	-0.046	-0.052	-0.063	-0.062	-0.060	-0.076	-0.081
DCP 1	.010	6.352	6.097	4.955	4.974	4.414	4.241	2.244	2.194	2.016	2.053	2.075
DCP 2	.020	5.846	5.704	4.163	4.091	3.485	3.404	1.833	1.770	1.702	1.639	1.626
DCP 3	.030	4.530	4.723	3.867	3.999	3.714	3.598	1.862	1.612	1.745	1.816	1.732
DCP 4	.049	3.451	3.451	2.864	2.757	2.499	2.411	2.935	2.895	2.729	2.605	2.709
DCP 5	.074	3.039	2.930	2.429	2.296	2.010	1.952	2.560	2.501	2.614	2.576	2.612
DCP 6	.099	2.692	2.736	2.235	2.214	1.812	1.762	2.269	2.292	2.332	2.510	2.467
DCP 7	.149	1.972	2.013	1.765	1.859	1.568	1.572	1.422	1.439	1.409	1.495	1.587
DCP 8	.200	1.713	1.707	1.713	1.747	1.613	1.514	1.339	1.255	1.146	1.220	1.120
DCP 9	.250	1.373	1.371	1.440	1.465	1.411	1.374	1.168	1.121	1.051	1.013	1.023
DCP10	.300	1.162	1.117	1.246	1.310	1.239	1.172	1.331	1.040	0.974	0.977	0.926
DCP11	.399	0.952	0.935	1.050	1.068	1.202	1.265	1.034	1.009	0.906	0.937	0.919
DCP12	.501	0.704	0.707	0.811	0.678	0.864	0.982	0.918	0.869	0.796	0.805	0.810
DCP13	.600	0.572	0.549	0.534	0.625	0.733	0.668	0.836	0.750	0.762	0.763	0.630
DCP14	.701	0.424	0.388	0.421	0.364	0.479	0.502	0.729	0.717	0.736	0.663	0.705
DCP15	.800	0.230	0.232	0.237	0.316	0.386	0.379	0.569	0.556	0.597	0.598	0.615
DCP16	.900	-0.049	-0.003	0.050	0.076	0.107	0.150	0.183	0.244	0.184	0.193	0.233
DCP17	.964	-0.074	-0.060	-0.043	-0.012	0.010	0.001	0.019	0.034	0.004	0.002	0.000

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.400 Rn = 2.3 x 10^6 SOLID FLOOR AND CEILING

DATA TYPE	X/C					
ALPHA		14.642	15.137	15.494	16.116	16.709
CN		0.981	0.958	0.987	0.978	0.983
CM		-0.066	-0.085	-0.084	-0.087	-0.091
DCP 1	.010	2.025	2.005	1.642	1.683	1.729
DCP 2	.020	1.722	1.662	1.702	1.704	1.770
DCP 3	.030	1.762	1.807	1.661	1.760	1.683
DCP 4	.047	2.647	2.476	2.477	2.652	2.466
DCP 5	.074	2.522	2.472	2.513	2.556	2.478
DCP 6	.099	2.615	2.575	2.612	2.649	2.547
DCP 7	.144	1.573	1.616	1.707	1.599	1.708
DCP 8	.200	1.286	1.164	1.244	1.162	1.156
DCP 9	.250	1.116	1.066	1.299	1.142	1.076
DCP10	.300	1.036	0.974	1.344	1.037	1.063
DCP11	.399	1.001	0.946	1.007	1.021	1.024
DCP12	.501	0.820	0.862	0.893	0.857	0.863
DCP13	.600	0.805	0.766	0.745	0.770	0.782
DCP14	.701	0.754	0.737	0.750	0.724	0.756
DCP15	.800	0.610	0.637	0.647	0.597	0.611
DCP16	.900	0.246	0.226	0.305	0.262	0.268
DCP17	.969	0.017	-0.005	0.149	0.060	0.059

$M = 0.399 \quad Rn = 4.7 \times 10^6$

SOLID FLOOR AND CEILING

ALPHA		-9.581	-9.015	-8.378	-7.817	-7.257	-6.653	-6.015	-5.455	-4.836	-4.258	-3.598
CN		-0.628	-0.605	-0.598	-0.535	-0.495	-0.486	-0.444	-0.414	-0.356	-0.303	-0.238
CM		-0.013	-0.023	-0.037	-0.042	-0.039	-0.033	-0.036	-0.025	-0.025	-0.023	-0.021
DCP 1	.010	-3.087	-3.234	-3.129	-2.635	-3.142	-4.793	-4.576	-4.816	-4.414	-3.547	-3.335
DCP 2	.020	-2.479	-2.410	-2.714	-2.616	-3.244	-3.545	-3.312	-2.977	-2.616	-2.438	-2.135
DCP 3	.030	-2.146	-2.159	-2.213	-3.150	-3.157	-3.071	-2.578	-2.606	-2.095	-1.864	-1.603
DCP 4	.049	-1.734	-1.866	-2.257	-2.452	-2.325	-2.035	-1.923	-1.676	-1.482	-1.282	-1.114
DCP 5	.074	-1.652	-1.787	-2.039	-2.198	-1.874	-1.461	-1.389	-1.206	-1.042	-0.845	-0.682
DCP 6	.099	-1.455	-1.575	-1.815	-1.668	-1.411	-1.169	-1.085	-0.953	-0.840	-0.685	-0.524
DCP 7	.149	-1.317	-1.403	-1.501	-1.265	-1.033	-0.883	-0.791	-0.726	-0.602	-0.510	-0.433
DCP 8	.200	-1.227	-1.241	-1.313	-0.902	-0.731	-0.675	-0.674	-0.585	-0.517	-0.415	-0.307
DCP 9	.250	-1.141	-1.194	-0.986	-0.807	-0.640	-0.606	-0.541	-0.520	-0.441	-0.351	-0.273
DCP10	.300	-1.032	-0.877	-0.724	-0.578	-0.468	-0.480	-0.442	-0.400	-0.325	-0.292	-0.197
DCP11	.399	-0.663	-0.520	-0.487	-0.349	-0.351	-0.363	-0.319	-0.311	-0.233	-0.227	-0.155
DCP12	.501	-0.403	-0.371	-0.291	-0.294	-0.282	-0.287	-0.257	-0.233	-0.201	-0.167	-0.119
DCP13	.600	-0.255	-0.197	-0.116	-0.117	-0.138	-0.161	-0.124	-0.121	-0.103	-0.090	-0.053
DCP14	.701	-0.055	-0.036	0.003	0.048	0.003	0.001	-0.033	0.014	0.017	0.041	0.065
DCP15	.800	-0.015	-0.001	0.013	-0.005	0.022	-0.001	0.048	-0.016	0.004	0.015	0.023
DCP16	.900	-0.032	-0.035	-0.033	-0.037	-0.052	-0.072	-0.076	-0.066	-0.099	-0.081	-0.105
DCP17	.965	-0.054	-0.035	-0.033	-0.015	0.010	-0.008	0.010	-0.029	-0.036	-0.029	-0.035

ALPHA		-3.020	-2.418	-1.806	-1.164	-0.552	0.031	1.231	1.814	2.401	3.091	3.646
CN		-0.176	-0.116	-0.052	0.009	0.075	0.129	0.263	0.326	0.387	0.455	0.515
CM		-0.018	-0.019	-0.016	-0.014	-0.015	-0.012	-0.014	-0.012	-0.011	-0.011	-0.008
DCP 1	.010	-2.732	-2.253	-1.810	-1.315	-0.869	-0.446	0.329	0.727	1.086	1.455	1.927
DCP 2	.020	-1.821	-1.512	-1.177	-0.896	-0.574	-0.227	0.361	0.711	1.052	1.358	1.659
DCP 3	.030	-1.310	-1.094	-0.824	-0.564	-0.279	-0.059	0.512	0.764	1.043	1.338	1.600
DCP 4	.049	-0.875	-0.677	-0.468	-0.226	-0.036	0.165	0.650	0.873	1.093	1.314	1.580
DCP 5	.074	-0.526	-0.346	-0.169	0.019	0.183	0.345	0.718	0.890	1.089	1.276	1.447
DCP 6	.099	-0.362	-0.241	-0.072	0.078	0.239	0.346	0.657	0.816	0.975	1.139	1.224
DCP 7	.149	-0.282	-0.158	-0.050	0.068	0.186	0.298	0.514	0.660	0.756	0.655	0.577
DCP 8	.200	-0.246	-0.166	-0.044	0.048	0.133	0.253	0.426	0.504	0.617	0.731	0.814
DCP 9	.250	-0.184	-0.120	-0.020	0.054	0.126	0.215	0.349	0.466	0.535	0.624	0.697
DCP10	.300	-0.155	-0.071	-0.018	0.068	0.137	0.194	0.340	0.408	0.465	0.556	0.615
DCP11	.399	-0.072	-0.069	0.025	0.066	0.115	0.169	0.274	0.346	0.413	0.449	0.506
DCP12	.501	-0.080	-0.038	-0.003	0.033	0.099	0.117	0.222	0.264	0.295	0.251	0.377
DCP13	.600	-0.016	0.029	0.047	0.066	0.096	0.125	0.217	0.261	0.266	0.211	0.234
DCP14	.701	0.080	0.110	0.133	0.161	0.176	0.190	0.259	0.267	0.307	0.329	0.336
DCP15	.800	0.032	0.045	0.050	0.062	0.086	0.098	0.122	0.138	0.124	0.174	0.172
DCP16	.900	-0.139	-0.101	-0.113	-0.111	-0.084	-0.106	-0.086	-0.073	-0.072	-0.074	-0.043
DCP17	.969	-0.053	-0.034	-0.040	-0.059	-0.052	-0.061	-0.045	-0.082	-0.045	-0.065	-0.095

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

SOLID FLOOR AND CEILING

M = 0.399 Rn = 4.7 x 10^6

ALPHA		4.233	4.892	5.471	6.070	6.652	7.302	7.847	8.456	9.065	9.675	10.266
CN		0.582	0.650	0.700	0.756	0.823	0.879	0.937	0.984	1.039	1.054	1.075
CM		-0.006	-0.008	-0.006	-0.001	-0.003	-0.001	0.002	0.005	0.005	0.015	0.020
DCP 1	.010	2.357	2.718	3.106	3.528	3.934	4.378	5.055	5.645	6.071	6.222	6.346
DCP 2	.020	2.053	2.363	2.639	2.998	3.152	3.496	3.719	3.837	4.263	5.098	5.585
DCP 3	.030	1.908	2.196	2.445	2.696	2.937	3.239	3.482	3.696	3.843	4.001	4.336
DCP 4	.049	1.821	2.023	2.226	2.501	2.726	2.910	3.163	3.362	3.473	3.566	3.652
DCP 5	.074	1.646	1.847	2.009	2.195	2.393	2.557	2.701	2.858	3.024	3.080	3.122
DCP 6	.099	1.454	1.626	1.754	1.911	2.052	2.206	2.356	2.457	2.585	2.657	2.688
DCP 7	.149	1.126	1.250	1.330	1.475	1.584	1.670	1.774	1.890	1.982	2.027	2.110
DCP 8	.200	0.904	1.004	1.108	1.156	1.279	1.364	1.440	1.528	1.608	1.623	1.656
DCP 9	.250	0.775	0.832	0.930	1.012	1.080	1.153	1.245	1.300	1.381	1.407	1.441
DCP10	.300	0.683	0.753	0.811	0.868	0.925	0.995	1.054	1.115	1.166	1.183	1.201
DCP11	.399	0.591	0.631	0.645	0.705	0.764	0.812	0.876	0.877	0.943	0.971	0.965
DCP12	.501	0.435	0.468	0.482	0.543	0.592	0.623	0.637	0.700	0.753	0.730	0.734
DCP13	.600	0.355	0.430	0.446	0.426	0.502	0.516	0.562	0.554	0.560	0.566	0.561
DCP14	.701	0.340	0.385	0.391	0.414	0.439	0.466	0.468	0.464	0.483	0.445	0.415
DCP15	.800	0.190	0.210	0.204	0.203	0.220	0.220	0.216	0.235	0.245	0.213	0.185
DCP16	.900	-0.065	-0.055	-0.019	-0.055	-0.046	-0.037	-0.036	-0.023	-0.026	-0.036	-0.032
DCP17	.969	-0.074	-0.075	-0.070	-0.062	-0.068	-0.066	-0.065	-0.080	-0.067	-0.073	-0.059

ALPHA		10.855	11.524	12.044	12.631	13.228	13.881	14.427	15.108	15.651	16.915	17.468
CN		1.074	1.037	1.057	1.054	1.038	1.056	1.029	1.012	1.052	1.101	1.099
CM		0.024	0.005	-0.008	-0.024	-0.040	-0.053	-0.045	-0.055	-0.061	-0.085	-0.087
DCP 1	.010	6.130	3.973	3.217	2.812	2.724	2.448	2.525	2.573	2.607	4.127	4.384
DCP 2	.020	5.637	3.939	3.254	2.880	2.760	2.416	2.502	2.605	2.697	3.226	2.911
DCP 3	.030	4.734	4.087	3.627	3.333	3.057	2.825	3.025	3.126	3.106	2.132	1.711
DCP 4	.049	3.754	3.793	3.706	3.455	3.140	3.094	2.854	2.613	2.711	2.644	2.559
DCP 5	.074	3.126	3.114	3.042	2.920	2.710	2.641	2.515	2.295	2.444	2.476	2.534
DCP 6	.099	2.635	2.657	2.623	2.491	2.280	2.382	2.258	2.110	2.346	2.165	2.331
DCP 7	.149	2.387	2.048	1.992	1.924	1.831	1.793	1.843	1.722	1.915	1.864	1.933
DCP 8	.200	1.703	1.736	1.767	1.664	1.616	1.534	1.561	1.566	1.571	1.564	1.632
DCP 9	.250	1.471	1.551	1.530	1.595	1.575	1.606	1.543	1.564	1.466	1.391	1.319
DCP10	.300	1.217	1.258	1.473	1.426	1.427	1.383	1.376	1.363	1.344	1.245	1.167
DCP11	.399	0.976	0.952	1.064	1.136	1.122	1.164	1.107	1.095	1.116	1.172	1.127
DCP12	.501	0.708	0.712	0.745	0.791	0.852	1.004	0.903	0.868	0.881	1.022	0.952
DCP13	.600	0.503	0.498	0.562	0.663	0.594	0.726	0.684	0.706	0.715	0.871	0.880
DCP14	.701	0.385	0.378	0.402	0.473	0.530	0.539	0.555	0.545	0.586	0.747	0.782
DCP15	.800	0.192	0.190	0.243	0.265	0.355	0.365	0.346	0.365	0.435	0.570	0.584
DCP16	.900	-0.021	0.036	0.033	0.046	0.120	0.140	0.140	0.163	0.234	0.235	0.246
DCP17	.969	-0.064	-0.023	0.016	-0.032	0.034	0.011	0.014	0.040	0.065	0.035	0.053

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.399 Rn = 4.7 x 10^6 SOLID FLOOR AND CEILING

ALPHA		18.044	18.647	19.219	19.863
CN		1.075	1.058	1.045	1.032
CM		-0.087	-0.087	-0.088	-0.092
DCP 1	.010	4.227	3.834	3.645	3.215
DCP 2	.020	2.942	2.906	2.776	2.679
DCP 3	.030	1.660	1.682	1.706	1.695
DCP 4	.049	2.470	2.606	2.445	2.281
DCP 5	.074	2.442	2.349	2.208	2.244
DCP 6	.099	2.193	2.172	2.160	2.128
DCP 7	.149	2.057	1.967	1.981	1.923
DCP 8	.200	1.686	1.693	1.617	1.559
DCP 9	.250	1.243	1.253	1.237	1.265
DCP10	.300	1.108	1.106	1.137	1.082
DCP11	.399	1.032	1.011	1.024	1.059
DCP12	.501	0.942	0.917	0.917	0.904
DCP13	.600	0.832	0.806	0.824	0.831
DCP14	.701	0.802	0.773	0.747	0.761
DCP15	.800	0.657	0.608	0.597	0.589
DCP16	.900	0.214	0.274	0.269	0.294
DCP17	.969	0.054	0.070	0.079	0.060

M = 0.400 Rn = 6.3 x 10^6

SOLID FLOOR AND CEILING

ALPHA		-9.588	-9.002	-8.486	-7.861	-7.241	-6.700	-6.094	-5.440	-4.878	-4.290	-3.665
CN		-0.684	-0.661	-0.615	-0.547	-0.526	-0.500	-0.470	-0.435	-0.384	-0.323	-0.268
CM		-0.016	-0.025	-0.036	-0.039	-0.038	-0.036	-0.034	-0.028	-0.025	-0.023	-0.019
DCP 1	.010	-2.006	-2.162	-2.247	-2.696	-4.038	-4.916	-5.153	-5.191	-4.784	-4.165	-3.545
DCP 2	.020	-1.886	-2.089	-2.130	-2.848	-3.475	-3.712	-3.447	-3.041	-2.844	-2.583	-2.305
DCP 3	.030	-3.220	-3.244	-3.190	-3.338	-3.243	-3.200	-3.071	-2.613	-2.148	-1.924	-1.685
DCP 4	.049	-2.200	-2.222	-2.538	-2.510	-2.325	-2.050	-1.912	-1.746	-1.545	-1.352	-1.162
DCP 5	.074	-1.947	-1.973	-2.276	-2.072	-1.715	-1.515	-1.311	-1.242	-1.100	-0.918	-0.739
DCP 6	.099	-1.807	-1.857	-1.875	-1.578	-1.355	-1.179	-1.100	-0.962	-0.824	-0.705	-0.559
DCP 7	.149	-1.589	-1.584	-1.356	-1.128	-1.092	-0.911	-0.840	-0.753	-0.691	-0.547	-0.437
DCP 8	.200	-1.169	-1.142	-1.025	-0.944	-0.796	-0.779	-0.707	-0.631	-0.586	-0.466	-0.374
DCP 9	.250	-1.193	-1.214	-1.100	-0.815	-0.742	-0.637	-0.582	-0.521	-0.464	-0.374	-0.303
DCP10	.300	-1.030	-0.990	-0.923	-0.617	-0.538	-0.499	-0.456	-0.434	-0.358	-0.311	-0.243
DCP11	.399	-0.760	-0.650	-0.499	-0.414	-0.371	-0.359	-0.361	-0.332	-0.292	-0.231	-0.199
DCP12	.501	-0.475	-0.347	-0.316	-0.292	-0.311	-0.297	-0.279	-0.255	-0.210	-0.186	-0.147
DCP13	.600	-0.236	-0.196	-0.143	-0.145	-0.137	-0.149	-0.130	-0.130	-0.103	-0.079	-0.057
DCP14	.701	-0.035	-0.059	0.010	0.013	0.005	-0.009	0.020	0.006	0.024	0.038	0.054
DCP15	.800	-0.038	0.006	0.002	0.023	0.002	0.008	0.001	0.012	-0.017	-0.030	0.012
DCP16	.900	-0.023	-0.075	-0.049	-0.046	-0.064	-0.053	-0.072	-0.114	-0.109	-0.105	-0.123
DCP17	.969	-0.016	0.002	0.016	-0.002	0.004	-0.008	-0.022	-0.030	-0.019	-0.019	-0.040

ALPHA		-3.046	-2.492	-1.882	-1.198	-0.666	-0.065	0.583	1.181	1.767	2.388	2.998
CN		-0.203	-0.142	-0.073	-0.011	0.052	0.115	0.186	0.250	0.316	0.371	0.437
CM		-0.016	-0.016	-0.016	-0.018	-0.014	-0.013	-0.016	-0.014	-0.013	-0.010	-0.010
DCP 1	.010	-2.928	-2.411	-1.930	-1.483	-0.998	-0.575	-0.186	0.229	0.641	1.018	1.432
DCP 2	.020	-2.010	-1.679	-1.330	-1.021	-0.693	-0.347	-0.032	0.264	0.639	0.946	1.255
DCP 3	.030	-1.428	-1.167	-0.890	-0.630	-0.362	-0.119	0.181	0.467	0.720	1.012	1.271
DCP 4	.049	-0.921	-0.713	-0.515	-0.309	-0.055	0.158	0.356	0.584	0.839	1.023	1.290
DCP 5	.074	-0.579	-0.403	-0.215	-0.035	0.135	0.322	0.512	0.701	0.869	1.053	1.234
DCP 6	.099	-0.401	-0.248	-0.094	0.047	0.206	0.336	0.508	0.692	0.805	0.981	1.142
DCP 7	.149	-0.325	-0.204	-0.077	0.010	0.146	0.258	0.375	0.481	0.631	0.727	0.830
DCP 8	.200	-0.289	-0.192	-0.089	-0.028	0.089	0.194	0.276	0.371	0.479	0.553	0.679
DCP 9	.250	-0.219	-0.155	-0.063	-0.011	0.091	0.170	0.249	0.351	0.433	0.497	0.574
DCP10	.300	-0.165	-0.098	-0.043	0.058	0.106	0.176	0.251	0.333	0.399	0.481	0.542
DCP11	.399	-0.134	-0.072	0.004	0.040	0.084	0.146	0.222	0.272	0.344	0.394	0.425
DCP12	.501	-0.105	-0.095	-0.015	0.026	0.067	0.126	0.165	0.193	0.245	0.273	0.341
DCP13	.600	-0.023	0.006	0.031	0.071	0.095	0.144	0.168	0.218	0.250	0.274	0.292
DCP14	.701	0.091	0.104	0.136	0.152	0.172	0.194	0.244	0.245	0.268	0.290	0.318
DCP15	.800	0.016	0.033	0.037	0.068	0.077	0.089	0.112	0.131	0.144	0.129	0.145
DCP16	.900	-0.137	-0.118	-0.115	-0.092	-0.098	-0.120	-0.090	-0.082	-0.083	-0.086	-0.071
DCP17	.969	-0.036	-0.032	-0.041	-0.029	-0.045	-0.037	-0.044	-0.047	-0.068	-0.060	-0.050

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.400 Rn = 6.3 x 10^6

SOLID FLOOR AND CEILING

LPHA		3.583	4.166	4.834	5.368	6.013	6.590	7.225	7.812	8.358	9.020	9.601
CN		0.500	0.576	0.643	0.694	0.763	0.831	0.887	0.944	1.000	1.033	1.063
CM		-0.008	-0.010	-0.010	-0.007	-0.006	-0.005	-0.001	0.000	0.002	0.006	0.011
DCP 1	.010	1.846	2.262	2.668	3.063	3.470	3.912	4.492	5.103	5.780	6.216	6.439
DCP 2	.020	1.593	1.958	2.260	2.566	2.915	3.277	3.568	3.871	4.001	4.106	4.817
DCP 3	.030	1.573	1.664	2.156	2.422	2.672	2.986	3.283	3.510	3.736	3.909	4.014
DCP 4	.049	1.538	1.759	2.013	2.221	[illegible]	2.727	2.951	3.177	3.359	3.501	3.600
DCP 5	.074	1.411	1.514	1.813	1.959	[illegible]	2.378	2.549	2.707	2.881	[illegible]	3.056
DCP 6	.099	1.305	1.446	1.632	[illegible]	[illegible]	2.087	2.225	2.345	2.518	[illegible]	2.667
DCP 7	.149	1.065	[illegible]	1.224	[illegible]	1.449	1.578	1.677	1.787	1.863	[illegible]	2.030
DCP 8	.200	0.762	[illegible]	[illegible]	[illegible]	1.151	1.265	1.350	1.427	1.526	1.574	1.617
DCP 9	.250	0.665	[illegible]	[illegible]	[illegible]	[illegible]	1.076	1.163	1.218	[illegible]	1.365	1.418
DCP10	.300	0.556	[illegible]	[illegible]	[illegible]	[illegible]	0.944	1.024	1.076	1.120	[illegible]	1.199
DCP11	.395	0.504	[illegible]	[illegible]	[illegible]	[illegible]	0.776	0.811	[illegible]	0.967	[illegible]	0.955
DCP12	.501	0.346	[illegible]	[illegible]	[illegible]	[illegible]	0.602	0.623	[illegible]	0.709	0.701	0.731
DCP13	.600	0.336	[illegible]	[illegible]	[illegible]	[illegible]	0.490	0.526	0.556	0.556	0.574	0.595
DCP14	.701	0.330	[illegible]	[illegible]	[illegible]	0.441	0.451	0.460	0.482	0.498	0.487	0.479
DCP15	.800	[illegible]	[illegible]	[illegible]	[illegible]	0.217	0.229	0.250	0.267	0.262	0.246	0.236
DCP16	.900	-0.073	[illegible]	[illegible]	[illegible]	-0.044	-0.022	-0.064	-0.042	-0.030	-0.010	-0.058
DCP17	.969	-0.070	-0.056	[illegible]	-0.063	-0.067	-0.070	-0.060	-0.075	-0.063	-0.077	-0.069

ALPHA		10.191	10.837	11.408	11.997	12.602	13.271	13.778	14.417	15.048	15.583	16.154
CN		1.091	1.092	1.081	1.075	1.035	1.020	[illegible]	1.037	1.035	1.023	1.040
CM		0.016	0.023	0.026	0.022	0.014	-0.009	-0.028	-0.036	-0.049	-0.055	-0.061
DCP 1	.010	6.458	6.339	6.184	5.952	5.646	4.741	4.863	4.670	4.655	4.120	4.211
DCP 2	.020	5.512	5.713	5.570	5.280	4.588	4.469	4.126	4.044	4.097	3.452	3.597
DCP 3	.030	4.338	4.788	4.996	4.962	4.715	4.235	3.943	3.660	3.357	3.128	3.228
DCP 4	.049	3.669	3.840	3.963	3.958	3.674	3.677	3.230	3.361	3.148	3.095	2.920
DCP 5	.074	3.139	3.140	3.146	3.125	2.950	2.795	2.487	2.527	2.521	2.383	2.211
DCP 6	.099	2.740	2.737	2.741	2.695	2.592	2.334	2.079	2.178	2.107	2.126	2.037
DCP 7	.149	2.073	2.108	2.082	2.105	1.956	1.775	1.698	1.736	1.704	1.714	1.717
DCP 8	.200	1.673	1.695	1.683	1.721	1.619	1.521	1.460	1.534	1.442	1.452	1.487
DCP 9	.250	1.424	1.430	1.415	1.386	1.318	1.309	1.328	1.382	1.257	1.276	1.396
DCP10	.300	1.263	1.248	1.215	1.213	1.234	1.185	1.222	1.199	1.154	1.141	1.192
DCP11	.395	0.587	0.982	0.951	0.953	0.914	0.936	1.015	0.977	1.015	1.026	1.011
DCP12	.501	0.738	0.720	0.711	0.685	0.658	0.731	0.738	0.797	0.791	0.843	0.906
DCP13	.600	0.575	0.545	0.529	0.495	0.479	0.557	0.626	0.660	0.765	0.732	0.760
DCP14	.701	0.440	0.426	0.355	0.354	0.370	0.476	0.495	0.543	0.607	0.585	0.628
DCP15	.800	0.214	0.195	0.198	0.191	0.247	0.287	0.344	0.376	0.442	0.472	0.519
DCP16	.900	-0.022	-0.053	-0.022	0.042	0.047	0.093	0.166	0.172	0.176	0.190	0.161
DCP17	.969	-0.046	-0.057	-0.037	-0.019	-0.023	0.007	0.017	0.070	0.055	0.055	0.043

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.400 Rn = 6.3 x 10^6 SOLID FLOOR AND CEILING

ALPHA		16.758	17.399	17.568	18.578	19.211	19.757
CN		1.022	1.033	1.007	0.974	1.018	1.003
CM		-0.065	-0.075	-0.070	-0.081	-0.095	-0.092
DCP 1	.010	3.689	3.702	3.516	3.499	3.505	3.523
DCP 2	.020	3.414	3.309	3.258	3.080	2.971	2.816
DCP 3	.030	3.059	2.832	2.855	2.770	2.470	2.225
DCP 4	.049	2.637	2.512	2.399	2.096	2.059	2.140
DCP 5	.074	2.120	2.225	1.970	1.750	1.815	1.849
DCP 6	.099	2.018	1.961	1.860	1.638	1.714	1.793
DCP 7	.149	1.664	1.668	1.764	1.499	1.564	1.628
DCP 8	.200	1.489	1.506	1.448	1.349	1.449	1.477
DCP 9	.250	1.372	1.394	1.384	1.322	1.306	1.311
DCP10	.300	1.224	1.234	1.242	1.183	1.247	1.145
DCP11	.399	1.077	1.101	1.050	1.100	1.150	1.054
DCP12	.501	0.992	0.928	0.872	0.931	0.980	0.928
DCP13	.600	0.704	0.747	0.784	0.780	0.868	0.857
DCP14	.701	0.639	0.650	0.634	0.626	0.711	0.748
DCP15	.800	0.477	0.504	0.470	0.517	0.553	0.569
DCP16	.900	0.203	0.248	0.216	0.226	0.257	0.231
DCP17	.969	0.064	0.082	0.045	0.068	0.076	0.072

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

SOLID FLOOR AND CEILING

M = 0.401 Rn = 7.0 x 10^6

ALPHA		-9.448	-8.826	-8.289	-7.706	-7.127	-6.434	-5.927	-5.336	-4.725	-4.092	-3.543
CN		-0.665	-0.626	-0.579	-0.529	-0.499	-0.496	-0.461	-0.409	-0.363	-0.308	-0.248
CM		-0.021	-0.031	-0.038	-0.039	-0.036	-0.035	-0.029	-0.028	-0.024	-0.020	-0.019
DCP 1	.010	-2.061	-2.199	-2.391	-2.558	-4.161	-5.116	-5.006	-5.077	-4.577	-3.946	-3.320
DCP 2	.020	-1.987	-2.122	-2.438	-3.244	-3.580	-3.656	-3.316	-2.935	-2.777	-2.533	-2.221
DCP 3	.030	-3.147	-3.208	-3.351	-3.198	-3.204	-3.126	-2.858	-2.281	-2.073	-1.838	-1.602
DCP 4	.049	-2.163	-2.415	-2.581	-2.476	-2.234	-2.012	-1.828	-1.671	-1.521	-1.320	-1.090
DCP 5	.074	-1.953	-2.006	-2.212	-2.075	-1.536	-1.447	-1.317	-1.184	-1.017	-0.840	-0.696
DCP 6	.099	-1.820	-1.910	-1.701	-1.476	-1.213	-1.132	-1.020	-0.912	-0.768	-0.629	-0.497
DCP 7	.149	-1.631	-1.468	-1.218	-1.108	-0.953	-0.929	-0.827	-0.721	-0.637	-0.519	-0.420
DCP 8	.200	-1.116	-1.046	-0.995	-0.821	-0.746	-0.746	-0.668	-0.605	-0.510	-0.472	-0.352
DCP 9	.250	-1.205	-1.121	-0.967	-0.798	-0.666	-0.590	-0.563	-0.503	-0.459	-0.387	-0.283
DCP10	.300	-1.015	-0.858	-0.718	-0.469	-0.536	-0.486	-0.447	-0.389	-0.333	-0.289	-0.212
DCP11	.399	-0.660	-0.563	-0.408	-0.393	-0.360	-0.377	-0.346	-0.302	-0.256	-0.226	-0.168
DCP12	.501	-0.421	-0.362	-0.348	-0.303	-0.264	-0.295	-0.270	-0.232	-0.204	-0.167	-0.150
DCP13	.600	-0.237	-0.154	-0.144	-0.159	-0.104	-0.162	-0.139	-0.123	-0.119	-0.090	-0.068
DCP14	.701	-0.029	-0.024	-0.014	0.011	0.016	0.007	-0.018	0.022	0.025	0.039	0.084
DCP15	.800	-0.023	0.018	0.016	0.011	0.010	-0.008	-0.023	-0.030	-0.018	-0.011	0.009
DCP16	.900	-0.035	-0.048	-0.021	-0.025	-0.061	-0.053	-0.084	-0.076	-0.092	-0.094	-0.108
DCP17	.969	-0.017	-0.030	-0.011	-0.025	0.008	-0.020	-0.013	-0.011	-0.029	-0.048	-0.042

ALPHA		-2.942	-2.305	-1.655	-1.101	-0.495	0.144	0.741	1.212	1.918	2.562	3.151
CN		-0.183	-0.120	-0.059	0.009	0.073	0.137	0.194	0.259	0.324	0.392	0.452
CM		-0.019	-0.017	-0.015	-0.018	-0.016	-0.016	-0.014	-0.014	-0.013	-0.012	-0.010
DCP 1	.010	-2.739	-2.213	-1.740	-1.311	-0.881	-0.475	-0.066	0.355	0.740	1.118	1.535
DCP 2	.020	-1.924	-1.580	-1.277	-0.924	-0.609	-0.296	0.011	0.342	0.654	0.588	1.294
DCP 3	.030	-1.356	-1.071	-0.802	-0.545	-0.302	-0.021	0.247	0.517	0.776	1.099	1.358
DCP 4	.049	-0.895	-0.701	-0.461	-0.233	-0.014	0.178	0.400	0.628	0.859	1.070	1.332
DCP 5	.074	-0.517	-0.351	-0.155	0.003	0.189	0.373	0.543	0.710	0.900	1.111	1.261
DCP 6	.099	-0.359	-0.213	-0.052	0.095	0.235	0.406	0.547	0.698	0.845	1.030	1.188
DCP 7	.149	-0.292	-0.183	-0.060	0.036	0.153	0.272	0.370	0.496	0.607	0.737	0.848
DCP 8	.200	-0.266	-0.141	-0.081	0.034	0.151	0.230	0.318	0.391	0.512	0.613	0.679
DCP 9	.250	-0.216	-0.138	-0.041	0.016	0.103	0.191	0.263	0.344	0.444	0.518	0.616
DCP10	.300	-0.134	-0.067	-0.002	0.059	0.152	0.199	0.260	0.337	0.412	0.500	0.545
DCP11	.399	-0.115	-0.071	-0.013	0.059	0.119	0.182	0.232	0.293	0.341	0.381	0.452
DCP12	.501	-0.097	-0.045	-0.004	0.034	0.072	0.118	0.157	0.203	0.247	0.309	0.342
DCP13	.600	-0.023	0.033	0.023	0.084	0.100	0.144	0.182	0.206	0.229	0.267	0.301
DCP14	.701	0.098	0.110	0.137	0.153	0.188	0.210	0.213	0.249	0.277	0.305	0.327
DCP15	.800	0.022	0.029	0.042	0.071	0.084	0.098	0.104	0.132	0.139	0.158	0.159
DCP16	.900	-0.106	-0.111	-0.104	-0.072	-0.080	-0.068	-0.069	-0.064	-0.058	-0.069	-0.062
DCP17	.969	-0.027	-0.047	-0.037	-0.035	-0.047	-0.046	-0.055	-0.067	-0.056	-0.058	-0.066

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

SOLID FLOOR AND CEILING

M = 0.401 Rn = 7.0 x 10^6

ALPHA		3.724	4.365	4.973	5.566	6.117	6.789	7.400	7.963	8.562	9.191	9.747
CN		0.524	0.578	0.643	0.701	0.761	0.829	0.878	0.941	0.994	1.036	1.056
CM		-0.013	-0.009	-0.009	-0.007	-0.004	-0.005	0.000	0.000	0.004	0.006	0.011
DCP 1	.010	1.952	2.308	2.721	3.091	3.512	3.966	4.475	5.232	5.880	6.311	6.454
DCP 2	.020	1.663	1.972	2.274	2.580	2.890	3.296	3.551	3.870	3.983	4.128	4.752
DCP 3	.030	1.629	1.903	2.216	2.408	2.624	3.004	3.261	3.524	3.733	3.925	4.012
DCP 4	.049	1.567	1.795	2.018	2.244	2.476	2.717	2.942	3.156	3.348	3.498	3.554
DCP 5	.074	1.454	1.622	1.820	1.994	2.193	2.383	2.541	2.692	2.875	2.999	3.050
DCP 6	.099	1.339	1.475	1.634	1.786	1.939	2.102	2.239	2.371	2.488	2.608	2.690
DCP 7	.149	0.966	1.089	1.235	1.311	1.439	1.537	1.632	1.764	1.866	1.938	1.977
DCP 8	.200	0.791	0.894	0.975	1.059	1.157	1.243	1.342	1.404	1.505	1.595	1.619
DCP 9	.250	0.696	0.757	0.846	0.918	0.993	1.098	1.135	1.223	1.296	1.362	1.391
DCP10	.300	0.637	0.684	0.748	0.817	0.881	0.940	1.011	1.065	1.114	1.157	1.198
DCP11	.399	0.497	0.545	0.611	0.671	0.712	0.757	0.804	0.852	0.912	0.938	0.974
DCP12	.501	0.383	0.408	0.461	0.510	0.546	0.599	0.613	0.643	0.685	0.721	0.703
DCP13	.600	0.361	0.389	0.404	0.433	0.461	0.492	0.528	0.541	0.568	0.570	0.571
DCP14	.701	0.354	0.356	0.395	0.408	0.419	0.448	0.431	0.467	0.484	0.483	0.468
DCP15	.800	0.189	0.207	0.208	0.211	0.234	0.245	0.245	0.262	0.256	0.249	0.258
DCP16	.900	-0.037	-0.046	-0.036	-0.052	-0.059	-0.033	-0.041	-0.015	-0.038	-0.006	-0.046
DCP17	.969	-0.058	-0.076	-0.075	-0.061	-0.074	-0.055	-0.073	-0.068	-0.065	-0.078	-0.078

ALPHA		10.391	10.998	11.622	12.183	12.724	13.441	13.994	14.575	15.174	15.840	16.344
CN		1.067	1.074	1.066	1.030	1.016	0.962	0.977	1.028	0.995	0.958	0.964
CM		0.018	0.021	0.023	0.027	0.010	-0.025	-0.030	-0.049	-0.048	-0.056	-0.056
DCP 1	.010	6.473	6.236	6.036	5.834	5.255	4.840	5.040	4.945	4.672	4.211	4.411
DCP 2	.020	5.358	5.585	5.542	5.392	4.983	4.072	4.180	3.858	3.972	3.621	3.674
DCP 3	.030	4.256	4.688	4.935	4.917	4.653	4.066	3.832	3.242	3.331	3.379	3.307
DCP 4	.049	3.615	3.773	3.878	3.855	3.644	3.017	3.126	3.187	2.819	2.296	2.409
DCP 5	.074	3.103	3.110	3.084	3.031	2.883	2.381	2.421	2.655	2.287	1.981	1.917
DCP 6	.099	2.690	2.703	2.643	2.579	2.459	1.927	1.995	2.142	1.979	1.732	1.758
DCP 7	.149	2.033	2.055	2.011	1.987	1.906	1.522	1.547	1.654	1.637	1.458	1.521
DCP 8	.200	1.653	1.672	1.651	1.622	1.592	1.345	1.405	1.337	1.411	1.428	1.373
DCP 9	.250	1.434	1.421	1.401	1.352	1.328	1.274	1.245	1.219	1.321	1.282	1.271
DCP10	.300	1.198	1.232	1.190	1.195	1.154	1.165	1.077	1.137	1.098	1.149	1.175
DCP11	.399	0.966	0.952	0.974	0.886	0.901	0.927	0.951	1.017	0.992	0.992	1.026
DCP12	.501	0.726	0.737	0.706	0.643	0.656	0.768	0.731	0.823	0.787	0.835	0.828
DCP13	.600	0.557	0.543	0.519	0.475	0.472	0.572	0.622	0.695	0.686	0.670	0.655
DCP14	.701	0.431	0.420	0.382	0.319	0.373	0.494	0.532	0.580	0.585	0.626	0.567
DCP15	.800	0.207	0.196	0.183	0.182	0.255	0.334	0.337	0.472	0.455	0.410	0.439
DCP16	.900	-0.041	-0.030	0.001	0.007	0.074	0.140	0.159	0.207	0.162	0.179	0.191
DCP17	.969	-0.070	-0.075	-0.065	-0.030	-0.008	-0.021	0.034	0.047	0.049	0.022	0.049

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

$M = 0.401$ $Rn = 7.0 \times 10^6$ SOLID FLOOR AND CEILING

ALPHA		17.010	17.585	18.177	18.756	19.325
CN		0.985	0.980	0.962	0.977	0.931
CM		-0.062	-0.069	-0.074	-0.083	-0.083
DCP 1	.010	3.988	3.695	3.447	3.268	3.121
DCP 2	.020	3.429	3.115	2.997	2.871	2.696
DCP 3	.030	3.099	2.751	2.784	2.468	2.582
DCP 4	.049	2.403	2.488	2.157	2.236	1.842
DCP 5	.074	1.997	2.076	1.916	1.846	1.657
DCP 6	.099	1.910	1.897	1.711	1.825	1.576
DCP 7	.149	1.544	1.530	1.509	1.502	1.421
DCP 8	.200	1.395	1.378	1.405	1.363	1.304
DCP 9	.250	1.382	1.280	1.307	1.242	1.223
DCP10	.300	1.160	1.149	1.201	1.149	1.177
DCP11	.399	1.067	1.046	1.028	1.120	1.047
DCP12	.501	0.859	0.856	0.866	0.912	0.915
DCP13	.600	0.680	0.753	0.701	0.805	0.774
DCP14	.701	0.579	0.633	0.605	0.665	0.638
DCP15	.800	0.464	0.469	0.506	0.510	0.484
DCP16	.900	0.233	0.223	0.227	0.218	0.217
DCP17	.969	0.039	0.048	0.086	0.072	0.064

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.500 Rn = 7.9 x 10^6

SOLID FLOOR AND CEILING

ALPHA		-9.525	-9.001	-8.421	-7.811	-7.252	-6.656	-6.024	-5.435	-4.878	-4.274	-3.558
CN		-0.676	-0.648	-0.616	-0.569	-0.526	-0.491	-0.442	-0.409	-0.368	-0.318	-0.259
CM		-0.008	-0.022	-0.036	-0.042	-0.044	-0.042	-0.039	-0.032	-0.029	-0.024	-0.021
DCP 1	.010	-2.275	-2.391	-2.888	-2.937	-3.432	-3.882	-3.810	-3.797	-3.521	-3.655	-3.773
DCP 2	.020	-2.150	-2.382	-2.626	-3.191	-3.334	-3.437	-3.270	-2.570	-2.939	-2.757	-2.171
DCP 3	.030	-2.668	-2.896	-3.088	-3.119	-3.107	-3.038	-2.809	-2.622	-2.590	-2.057	-1.700
DCP 4	.049	-2.104	-2.219	-2.417	-2.480	-2.476	-2.425	-2.288	-2.110	-1.650	-1.295	-1.131
DCP 5	.074	-1.834	-1.913	-2.161	-2.106	-1.905	-1.766	-1.555	-1.399	-1.134	-0.875	-0.732
DCP 6	.099	-1.800	-1.850	-1.729	-1.725	-1.557	-1.377	-1.122	-0.939	-0.842	-0.711	-0.551
DCP 7	.149	-1.494	-1.489	-1.437	-1.267	-1.152	-0.940	-0.798	-0.724	-0.612	-0.526	-0.436
DCP 8	.200	-1.137	-1.127	-1.301	-0.944	-0.853	-0.737	-0.695	-0.639	-0.544	-0.457	-0.368
DCP 9	.250	-1.123	-1.176	-1.036	-0.899	-0.742	-0.654	-0.556	-0.517	-0.441	-0.385	-0.308
DCP10	.300	-0.952	-0.862	-0.688	-0.656	-0.546	-0.475	-0.433	-0.383	-0.343	-0.298	-0.208
DCP11	.399	-0.727	-0.591	-0.478	-0.429	-0.349	-0.346	-0.303	-0.279	-0.262	-0.216	-0.154
DCP12	.501	-0.455	-0.426	-0.339	-0.292	-0.274	-0.262	-0.236	-0.221	-0.195	-0.189	-0.143
DCP13	.600	-0.339	-0.192	-0.172	-0.144	-0.144	-0.158	-0.110	-0.127	-0.108	-0.077	-0.056
DCP14	.701	-0.090	-0.063	0.009	0.029	0.036	0.015	0.029	0.041	0.041	0.032	0.065
DCP15	.800	-0.056	-0.056	-0.013	0.016	0.015	0.041	0.013	0.010	0.012	0.004	0.005
DCP16	.900	-0.077	-0.041	-0.051	-0.019	-0.035	-0.044	-0.033	-0.075	-0.082	-0.081	-0.122
DCP17	.969	-0.000	-0.010	-0.002	-0.026	0.015	0.006	-0.005	-0.018	-0.017	-0.033	-0.024

ALPHA		-3.047	-2.452	-1.851	-1.162	-0.620	0.010	0.680	1.186	1.801	2.458	3.015
CN		-0.198	-0.137	-0.070	-0.007	0.059	0.128	0.196	0.262	0.327	0.401	0.472
CM		-0.021	-0.017	-0.017	-0.016	-0.016	-0.016	-0.015	-0.013	-0.010	-0.012	-0.010
DCP 1	.010	-3.198	-2.551	-1.966	-1.538	-1.072	-0.680	-0.276	0.162	0.605	0.817	1.397
DCP 2	.020	-2.014	-1.686	-1.371	-1.050	-0.709	-0.363	-0.044	0.333	0.665	0.991	1.322
DCP 3	.030	-1.463	-1.217	-0.943	-0.673	-0.425	-0.138	0.165	0.451	0.738	1.053	1.346
DCP 4	.049	-0.922	-0.696	-0.485	-0.265	-0.032	0.175	0.419	0.663	0.911	1.159	1.430
DCP 5	.074	-0.552	-0.369	-0.186	-0.015	0.164	0.385	0.576	0.757	0.956	1.172	1.377
DCP 6	.099	-0.415	-0.267	-0.095	0.048	0.208	0.359	0.552	0.715	0.882	1.061	1.240
DCP 7	.149	-0.328	-0.187	-0.071	0.033	0.162	0.284	0.402	0.543	0.648	0.756	0.897
DCP 8	.200	-0.277	-0.194	-0.088	-0.001	0.114	0.234	0.303	0.400	0.514	0.626	0.732
DCP 9	.250	-0.227	-0.140	-0.052	0.017	0.101	0.200	0.291	0.371	0.461	0.554	0.632
DCP10	.300	-0.142	-0.076	-0.034	0.061	0.121	0.203	0.259	0.351	0.424	0.510	0.578
DCP11	.399	-0.121	-0.054	-0.004	0.063	0.118	0.184	0.235	0.294	0.354	0.426	0.488
DCP12	.501	-0.081	-0.060	-0.007	0.031	0.071	0.113	0.179	0.205	0.258	0.296	0.345
DCP13	.600	-0.018	0.002	0.038	0.056	0.095	0.133	0.181	0.211	0.232	0.297	0.318
DCP14	.701	0.080	0.105	0.133	0.162	0.165	0.194	0.230	0.255	0.263	0.308	0.338
DCP15	.800	0.021	0.028	0.050	0.058	0.073	0.090	0.114	0.112	0.126	0.143	0.174
DCP16	.900	-0.107	-0.118	-0.110	-0.098	-0.081	-0.078	-0.092	-0.091	-0.077	-0.076	-0.087
DCP17	.969	-0.027	-0.042	-0.049	-0.052	-0.040	-0.037	-0.060	-0.048	-0.070	-0.072	-0.063

M = 0.500 Rn = 7.9 x 10^6

SOLID FLOOR AND CEILING

ALPHA		3.624	4.265	4.861	5.428	6.048	6.661	7.251	7.833	8.523	9.054	9.685
CN		0.542	0.610	0.671	0.734	0.795	0.862	0.927	0.973	1.005	1.037	1.086
CM		-0.009	-0.007	-0.006	-0.002	-0.002	0.002	0.004	0.013	0.019	0.025	0.025
DCP 1	.010	1.872	2.285	2.692	3.103	3.613	4.350	4.850	4.891	5.018	5.135	4.903
DCP 2	.020	1.698	2.043	2.369	2.709	2.836	3.757	4.425	4.830	5.006	5.152	5.031
DCP 3	.030	1.657	1.962	2.268	2.570	2.805	2.830	4.106	4.457	4.732	4.888	4.507
DCP 4	.049	1.715	1.964	2.226	2.485	2.750	3.051	2.726	4.125	4.429	4.625	4.688
DCP 5	.074	1.586	1.786	1.994	2.181	2.385	2.585	2.720	2.459	2.868	3.417	3.218
DCP 6	.099	1.414	1.611	1.702	1.858	2.072	2.219	2.348	2.349	2.284	2.453	2.579
DCP 7	.149	1.040	1.163	1.274	1.405	1.516	1.620	1.727	1.787	1.826	1.830	1.912
DCP 8	.200	0.825	0.921	1.022	1.123	1.210	1.295	1.379	1.424	1.484	1.503	1.786
DCP 9	.250	0.731	0.821	0.874	0.965	1.044	1.122	1.195	1.233	1.285	1.305	1.622
DCP10	.300	0.648	0.727	0.798	0.856	0.927	0.977	1.033	1.082	1.117	1.139	1.404
DCP11	.399	0.530	0.588	0.649	0.704	0.761	0.812	0.855	0.878	0.858	0.910	0.950
DCP12	.501	0.394	0.443	0.494	0.518	0.556	0.601	0.638	0.660	0.674	0.672	0.683
DCP13	.600	0.361	0.391	0.401	0.437	0.481	0.490	0.525	0.530	0.534	0.534	0.489
DCP14	.701	0.357	0.365	0.393	0.432	0.437	0.440	0.460	0.449	0.442	0.418	0.356
DCP15	.800	0.176	0.193	0.201	0.204	0.220	0.220	0.248	0.224	0.197	0.194	0.165
DCP16	.900	-0.071	-0.065	-0.065	-0.057	-0.056	-0.051	-0.047	-0.055	-0.055	-0.044	0.036
DCP17	.969	-0.068	-0.064	-0.063	-0.073	-0.077	-0.072	-0.075	-0.079	-0.081	-0.079	-0.052

ALPHA		10.272	10.886	11.449	12.043	12.681	13.258	13.850	14.465	15.113	15.624	16.230
CN		1.073	1.033	0.985	0.976	0.948	0.945	0.965	0.948	0.977	0.992	0.977
CM		0.014	0.010	-0.001	-0.009	-0.017	-0.032	-0.031	-0.038	-0.046	-0.055	-0.064
DCP 1	.010	4.704	4.662	4.452	4.332	4.241	4.124	4.025	3.885	3.551	3.609	3.731
DCP 2	.020	4.647	4.622	4.268	3.890	3.743	3.488	3.315	3.320	2.955	2.831	2.550
DCP 3	.030	4.891	4.849	4.552	3.707	3.529	3.360	3.218	3.120	2.941	2.815	2.668
DCP 4	.049	4.109	3.444	3.060	2.916	2.700	2.440	2.526	2.309	2.412	2.466	2.153
DCP 5	.074	3.071	2.799	2.483	2.497	2.128	2.072	2.129	1.951	2.078	2.143	1.979
DCP 6	.099	2.433	2.442	2.254	2.181	2.073	1.967	2.012	1.945	2.030	2.049	1.843
DCP 7	.149	1.878	1.891	1.812	1.866	1.723	1.711	1.779	1.721	1.769	1.730	1.675
DCP 8	.200	1.786	1.675	1.517	1.562	1.546	1.474	1.543	1.533	1.538	1.520	1.581
DCP 9	.250	1.688	1.564	1.477	1.415	1.387	1.339	1.439	1.421	1.437	1.407	1.363
DCP10	.300	1.377	1.281	1.215	1.243	1.259	1.169	1.286	1.194	1.307	1.237	1.252
DCP11	.399	1.032	1.046	1.014	1.058	0.954	0.964	1.068	1.048	1.043	1.065	1.086
DCP12	.501	0.691	0.713	0.706	0.724	0.744	0.826	0.719	0.748	0.789	0.845	0.834
DCP13	.600	0.502	0.450	0.465	0.491	0.572	0.627	0.617	0.637	0.676	0.712	0.707
DCP14	.701	0.376	0.361	0.396	0.373	0.431	0.433	0.454	0.467	0.530	0.582	0.611
DCP15	.800	0.180	0.187	0.240	0.237	0.264	0.324	0.318	0.308	0.382	0.412	0.437
DCP16	.900	0.004	0.030	0.038	0.063	0.067	0.082	0.082	0.144	0.113	0.158	0.159
DCP17	.969	0.005	-0.005	-0.026	0.021	-0.026	0.012	0.008	0.007	-0.004	-0.008	0.037

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.500 Rn = 7.9 x 10^6 SOLID FLOOR AND CEILING

ALPHA		16.910	17.450	18.013
CN		0.570	0.580	0.576
CM		-0.070	-0.077	-0.080
DCP 1	.010	3.363	3.411	2.837
DCP 2	.020	2.537	2.684	2.751
DCP 3	.030	2.721	2.788	2.778
DCP 4	.049	2.042	1.965	2.026
DCP 5	.074	1.962	1.855	1.724
DCP 6	.099	1.823	1.725	1.735
DCP 7	.149	1.613	1.612	1.581
DCP 8	.200	1.469	1.344	1.421
DCP 9	.250	1.332	1.354	1.401
DCP10	.300	1.217	1.260	1.205
DCP11	.399	1.117	1.112	1.127
DCP12	.501	0.878	0.921	0.927
DCP13	.600	0.741	0.771	0.827
DCP14	.701	0.587	0.664	0.635
DCP15	.800	0.462	0.457	0.446
DCP16	.900	0.195	0.200	0.203
DCP17	.969	0.001	0.030	0.050

M = 0.597 Rn = 3.1 x 10^6

SOLID FLOOR AND CEILING

ALPHA		-8.428	-7.926	-7.413	-6.906	-6.365	-5.870	-5.329	-4.862	-4.304	-3.775	-2.702
CN		-0.642	-0.640	-0.617	-0.585	-0.563	-0.536	-0.498	-0.451	-0.396	-0.340	-0.233
CM		0.013	0.008	-0.001	-0.013	-0.026	-0.034	-0.041	-0.044	-0.038	-0.032	-0.025
NCP 1	.010	-2.372	2.448	-2.514	-2.528	-2.541	-2.599	-2.599	-2.588	-2.641	-2.796	-2.923
NCP 2	.020	-2.329	-2.397	-2.410	-2.349	-2.415	-2.443	-2.448	-2.476	-2.528	-2.656	-2.555
NCP 3	.030	-2.658	-2.715	-2.718	-2.687	-2.673	-2.633	-2.619	-2.505	-2.423	-2.369	-1.962
NCP 4	.049	-1.584	-1.577	-1.587	-1.612	-1.755	-1.813	-1.846	-1.846	-1.960	-1.858	-0.950
NCP 5	.074	-1.426	-1.408	-1.410	-1.426	-1.562	-1.649	-1.642	-1.635	-1.649	-1.306	-0.580
NCP 6	.099	-1.291	-1.294	-1.293	-1.322	-1.457	-1.459	-1.453	-1.483	-1.309	-0.910	-0.410
NCP 7	.149	-1.243	-1.271	-1.264	-1.289	-1.325	-1.351	-1.373	-1.273	-0.984	-0.646	-0.389
NCP 8	.200	-1.110	-1.149	-1.156	-1.128	-1.159	-1.125	-1.138	-0.953	-0.610	-0.443	-0.264
NCP 9	.250	-1.086	-1.110	-1.087	-1.082	-1.060	-1.004	-0.958	-0.693	-0.417	-0.395	-0.249
NCP10	.300	-0.899	-0.920	-0.897	-0.918	-0.792	-0.737	-0.599	-0.491	-0.363	-0.312	-0.196
NCP11	.399	-0.665	-0.628	-0.691	-0.570	-0.543	-0.486	-0.368	-0.300	-0.258	-0.245	-0.135
NCP12	.501	-0.540	-0.517	-0.446	-0.429	-0.324	-0.249	-0.218	-0.179	-0.202	-0.153	-0.094
NCP13	.600	-0.359	-0.387	-0.280	-0.197	-0.172	-0.124	-0.104	-0.066	-0.091	-0.082	-0.016
NCP14	.701	-0.113	-0.105	-0.093	-0.016	0.038	0.044	0.072	0.087	0.077	0.066	0.094
NCP15	.800	-0.101	-0.086	-0.028	0.012	0.032	0.051	0.075	0.063	0.049	0.035	0.041
NCP16	.900	-0.178	-0.134	-0.100	-0.097	-0.070	-0.033	-0.056	-0.044	-0.044	-0.066	-0.091
NCP17	.969	-0.079	-0.049	-0.086	-0.065	-0.026	-0.050	-0.007	0.001	-0.020	-0.034	-0.035

ALPHA		-2.206	-1.644	-1.129	-0.597	-0.071	0.451	0.988	1.514	2.026	2.540	3.076
CN		-0.140	-0.079	-0.006	0.061	0.126	0.201	0.269	0.346	0.419	0.492	0.565
CM		-0.022	-0.017	-0.016	-0.013	-0.008	-0.008	-0.005	-0.005	-0.001	0.000	0.000
NCP 1	.010	-2.517	-2.006	-1.563	-1.072	-0.682	-0.105	0.334	0.759	1.206	1.602	1.985
NCP 2	.020	-2.196	-1.604	-1.082	-0.777	-0.305	-0.058	0.272	0.616	0.962	1.304	1.617
NCP 3	.030	-1.064	-0.881	-0.701	-0.393	-0.073	0.217	0.526	0.822	1.150	1.458	1.742
NCP 4	.049	-0.753	-0.545	-0.287	-0.073	0.204	0.442	0.708	0.989	1.259	1.601	1.897
NCP 5	.074	-0.388	-0.197	0.012	0.227	0.417	0.633	0.856	1.084	1.331	1.608	1.900
NCP 6	.099	-0.268	-0.092	0.080	0.272	0.426	0.630	0.835	1.025	1.221	1.460	1.703
NCP 7	.149	-0.240	-0.120	0.003	0.134	0.271	0.410	0.559	0.733	0.890	0.928	0.925
NCP 8	.200	-0.168	-0.072	0.025	0.144	0.255	0.379	0.468	0.557	0.701	0.906	0.935
NCP 9	.250	-0.162	-0.064	0.031	0.118	0.219	0.292	0.404	0.484	0.592	0.691	0.782
NCP10	.300	-0.115	-0.035	0.036	0.117	0.203	0.272	0.352	0.440	0.510	0.602	0.666
NCP11	.399	-0.078	-0.031	0.047	0.102	0.179	0.243	0.287	0.357	0.414	0.491	0.568
NCP12	.501	-0.058	-0.009	0.059	0.099	0.129	0.197	0.226	0.267	0.329	0.367	0.416
NCP13	.600	0.031	0.029	0.073	0.107	0.142	0.166	0.194	0.231	0.273	0.303	0.343
NCP14	.701	0.124	0.154	0.178	0.188	0.195	0.228	0.261	0.289	0.286	0.324	0.344
NCP15	.800	0.050	0.062	0.054	0.071	0.059	0.069	0.083	0.097	0.108	0.120	0.153
NCP16	.900	-0.088	-0.150	-0.125	-0.142	-0.144	-0.139	-0.136	-0.116	-0.120	-0.121	-0.117
NCP17	.969	-0.039	-0.037	-0.062	-0.058	-0.086	-0.069	-0.095	-0.074	-0.089	-0.098	-0.094

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.597 Rn = 3.1 x 10^6

SOLID FLOOR AND CEILING

ALPHA		3.600	4.131	4.662	5.172	5.687	6.215	6.740	7.235	7.798	8.301	8.818
CN		0.622	0.694	0.772	0.835	0.872	0.908	0.928	0.914	0.955	0.947	0.937
CM		0.004	0.008	0.013	0.018	0.025	0.026	0.025	0.026	0.022	0.006	-0.006
DCP 1	.010	2.139	2.407	2.944	3.277	3.472	3.715	3.648	3.225	3.527	3.921	3.771
DCP 2	.020	1.903	2.165	2.405	2.830	3.050	3.242	3.397	3.462	3.562	3.539	3.456
DCP 3	.030	1.985	2.147	2.372	2.748	3.014	3.211	3.344	3.400	3.448	3.391	3.175
DCP 4	.049	2.149	2.352	2.518	2.659	2.924	3.083	3.153	3.085	3.397	3.013	2.733
DCP 5	.074	2.228	2.485	2.654	2.758	2.919	2.929	2.959	2.877	2.872	2.617	2.376
DCP 6	.099	2.019	2.293	2.519	2.656	2.729	2.804	2.720	2.576	2.570	2.326	2.226
DCP 7	.149	0.970	1.389	2.011	2.259	2.176	2.057	1.992	2.003	2.131	1.926	1.912
DCP 8	.200	0.996	1.032	1.118	1.402	1.658	1.780	1.798	1.817	1.896	1.767	1.688
DCP 9	.250	0.859	0.909	0.942	0.997	1.196	1.376	1.488	1.481	1.587	1.456	1.372
DCP10	.300	0.737	0.782	0.827	0.842	0.922	1.016	1.124	1.182	1.231	1.188	1.242
DCP11	.399	0.586	0.657	0.690	0.719	0.711	0.757	0.826	0.917	0.891	0.922	0.967
DCP12	.501	0.449	0.489	0.503	0.541	0.530	0.556	0.574	0.572	0.613	0.675	0.674
DCP13	.600	0.367	0.387	0.413	0.417	0.406	0.412	0.427	0.368	0.370	0.473	0.502
DCP14	.701	0.363	0.359	0.383	0.370	0.345	0.305	0.283	0.285	0.290	0.352	0.400
DCP15	.800	0.146	0.149	0.156	0.160	0.137	0.136	0.124	0.141	0.163	0.181	0.184
DCP16	.900	-0.121	-0.113	-0.100	-0.091	-0.089	-0.065	-0.052	-0.088	-0.054	-0.030	0.018
DCP17	.969	-0.099	-0.096	-0.109	-0.082	-0.092	-0.095	-0.100	-0.133	-0.085	-0.095	-0.035

ALPHA		9.363	10.402	10.906	11.442	11.936	12.492	12.981	13.511	14.035	15.420
CN		0.936	0.927	0.912	0.849	0.848	0.867	0.895	0.920	0.924	0.991
CM		-0.029	-0.063	-0.068	-0.066	-0.063	-0.067	-0.070	-0.072	-0.070	-0.083
DCP 1	.010	3.536	2.403	2.177	1.972	1.995	1.993	2.034	2.125	2.047	1.997
DCP 2	.020	3.014	2.174	1.931	1.712	1.694	1.574	1.713	1.727	1.726	1.809
DCP 3	.030	2.926	2.337	1.870	1.772	1.709	1.718	1.742	1.755	1.769	1.796
DCP 4	.049	2.642	2.861	2.784	2.661	2.635	2.605	2.563	2.646	2.652	2.451
DCP 5	.074	2.397	2.493	2.659	2.467	2.405	2.438	2.412	2.476	2.504	2.407
DCP 6	.099	2.208	2.282	2.148	2.212	2.237	2.264	2.262	2.377	2.462	2.448
DCP 7	.149	1.677	1.479	1.393	1.259	1.339	1.386	1.570	1.601	1.671	1.896
DCP 8	.200	1.444	1.156	1.169	1.057	1.008	1.070	1.093	1.162	1.139	1.262
DCP 9	.250	1.274	1.075	1.062	0.924	0.990	1.032	1.041	1.075	1.079	1.208
DCP10	.300	1.127	1.028	0.983	0.870	0.889	0.926	0.978	0.963	0.990	1.098
DCP11	.399	0.965	0.980	0.926	0.926	0.850	0.857	0.896	0.907	0.913	1.044
DCP12	.501	0.795	0.824	0.876	0.736	0.731	0.749	0.793	0.793	0.918	0.894
DCP13	.600	0.663	0.751	0.601	0.679	0.658	0.670	0.721	0.733	0.706	0.787
DCP14	.701	0.512	0.633	0.636	0.638	0.641	0.635	0.656	0.682	0.663	0.720
DCP15	.800	0.379	0.482	0.530	0.554	0.530	0.543	0.566	0.544	0.553	0.562
DCP16	.900	0.055	0.133	0.140	0.171	0.143	0.196	0.162	0.193	0.179	0.229
DCP17	.969	-0.057	-0.128	-0.067	-0.049	-0.052	-0.059	-0.044	-0.001	-0.017	-0.012

M = 0.597 Rn = 6.2 x

SOLID FLOOR AND CEILING

ALPHA		-9.491	-8.990	-8.374	-7.767	-7.170	-6.568	-5.963	-5.377	-4.776	-4.176	-3.539
CN		-0.767	-0.675	-0.658	-0.611	-0.582	-0.514	-0.482	-0.449	-0.389	-0.337	-0.279
CM		0.007	-0.006	-0.018	-0.024	-0.033	-0.046	-0.044	-0.041	-0.038	-0.032	-0.029
DCP 1	.010	-3.175	-3.249	-3.295	-3.406	-3.700	-3.598	-3.029	-2.892	-3.168	-3.363	-3.323
DCP 2	.020	-2.511	-2.535	-2.411	-2.322	-2.051	-2.200	-2.570	-2.633	-2.858	-2.888	-2.898
DCP 3	.030	-2.702	-2.732	-2.519	-2.373	-1.983	-2.058	-2.330	-2.447	-2.611	-2.535	-2.269
DCP 4	.049	-2.491	-2.083	-2.382	-2.542	-2.455	-2.428	-2.258	-1.979	-2.111	-1.889	-1.349
DCP 5	.074	-2.026	-1.833	-2.072	-2.216	-2.078	-2.015	-1.886	-1.688	-1.566	-1.115	-0.825
DCP 6	.099	-1.809	-1.628	-1.768	-1.689	-1.598	-1.768	-1.614	-1.480	-1.132	-0.601	-0.592
DCP 7	.149	-1.362	-1.465	-1.160	-1.358	-1.402	-1.300	-1.216	-1.117	-0.714	-0.556	-0.465
DCP 8	.200	-1.273	-1.247	-1.156	-1.290	-1.095	-0.949	-0.904	-0.883	-0.584	-0.472	-0.405
DCP 9	.250	-1.205	-1.128	-1.143	-1.038	-0.827	-0.759	-0.669	-0.596	-0.444	-0.403	-0.322
DCP10	.300	-0.947	-0.843	-0.936	-0.793	-0.697	-0.582	-0.450	-0.449	-0.342	-0.286	-0.239
DCP11	.399	-0.671	-0.579	-0.653	-0.565	-0.548	-0.382	-0.367	-0.301	-0.258	-0.214	-0.178
DCP12	.501	-0.507	-0.416	-0.435	-0.315	-0.394	-0.246	-0.253	-0.198	-0.190	-0.165	-0.144
DCP13	.600	-0.422	-0.328	-0.264	-0.165	-0.225	-0.099	-0.104	-0.092	-0.079	-0.083	-0.061
DCP14	.701	-0.234	-0.124	-0.060	0.027	0.068	0.079	0.049	0.068	0.057	0.076	0.081
DCP15	.800	-0.156	-0.132	-0.007	-0.005	0.043	0.061	0.082	0.031	0.045	0.023	0.033
DCP16	.900	-0.153	-0.081	-0.059	-0.029	-0.047	-0.032	-0.032	-0.044	-0.075	-0.088	-0.078
DCP17	.969	-0.021	-0.049	-0.062	-0.056	-0.018	-0.002	-0.015	0.003	-0.015	-0.028	-0.014

ALPHA		-2.976	-2.332	-1.729	-1.152	-0.543	0.103	0.678	1.288	1.911	2.471	3.763
CN		-0.216	-0.146	-0.079	-0.002	0.070	0.143	0.216	0.292	0.369	0.438	0.591
CM		-0.025	-0.021	-0.018	-0.017	-0.015	-0.014	-0.012	-0.011	-0.011	-0.009	-0.003
DCP 1	.010	-3.149	-2.787	-2.245	-1.592	-1.104	-0.650	-0.197	0.185	0.625	1.023	1.794
DCP 2	.020	-2.740	-1.853	-1.342	-1.066	-0.719	-0.390	-0.099	0.335	0.686	1.017	1.687
DCP 3	.030	-1.674	-1.250	-1.035	-0.748	-0.444	-0.138	0.182	0.484	0.894	1.108	1.714
DCP 4	.049	-0.966	-0.757	-0.531	-0.282	-0.026	0.220	0.495	0.765	1.065	1.337	1.961
DCP 5	.074	-0.601	-0.392	-0.205	0.006	0.229	0.443	0.632	0.896	1.137	1.369	1.969
DCP 6	.099	-0.464	-0.297	-0.174	0.057	0.254	0.451	0.628	0.824	1.039	1.255	1.765
DCP 7	.149	-0.339	-0.222	-0.084	0.046	0.182	0.319	0.471	0.633	0.753	0.829	1.115
DCP 8	.200	-0.301	-0.213	-0.095	0.021	0.135	0.248	0.330	0.480	0.593	0.691	0.927
DCP 9	.250	-0.243	-0.155	-0.074	0.026	0.171	0.221	0.317	0.419	0.514	0.616	0.787
DCP10	.300	-0.175	-0.101	-0.022	0.078	0.141	0.234	0.309	0.386	0.469	0.558	0.737
DCP11	.399	-0.122	-0.061	-0.006	0.057	0.127	0.192	0.259	0.326	0.379	0.459	0.567
DCP12	.501	-0.096	-0.051	-0.015	0.053	0.089	0.143	0.188	0.235	0.285	0.338	0.428
DCP13	.600	-0.033	-0.004	0.024	0.066	0.139	0.135	0.190	0.217	0.270	0.297	0.379
DCP14	.701	0.102	0.124	0.140	0.171	0.196	0.222	0.245	0.269	0.292	0.315	0.366
DCP15	.800	0.042	0.051	0.050	0.071	0.079	0.088	0.118	0.117	0.136	0.136	0.164
DCP16	.900	-0.103	-0.117	-0.113	-0.126	-0.118	-0.107	-0.132	-0.105	-0.092	-0.096	-0.094
DCP17	.969	-0.037	-0.046	-0.041	-0.055	-0.058	-0.069	-0.072	-0.075	-0.065	-0.082	-0.092

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.597 Rn = 6.2 x 10^6

SOLID FLOOR AND CEILING

ALPHA		4.311	4.921	5.566	6.153	6.760	7.360	7.971	8.576	9.788	10.338	10.937
CN		0.655	0.722	0.807	0.867	0.923	0.935	0.948	0.953	0.965	0.936	0.965
CM		0.001	0.004	0.007	0.014	0.020	0.025	0.030	0.029	0.014	0.002	-0.005
CP 1	.010	2.183	2.546	2.968	3.240	3.426	3.500	3.633	3.697	3.802	3.793	3.766
CP 2	.020	1.988	2.268	2.533	2.973	3.222	3.325	3.437	3.557	3.679	3.635	3.692
CP 3	.030	1.947	2.136	2.351	2.785	3.014	3.132	3.267	3.370	3.449	3.176	3.316
CP 4	.049	2.220	2.392	2.517	2.770	3.007	3.110	3.253	3.310	3.195	2.811	2.828
CP 5	.074	2.279	2.490	2.648	2.784	2.980	3.103	3.155	3.077	2.687	2.452	2.579
CP 6	.099	2.163	2.467	2.740	2.866	3.000	3.013	2.976	2.732	2.436	2.203	2.329
CP 7	.149	1.317	1.447	2.133	2.486	2.626	2.434	2.703	2.151	2.099	2.033	1.890
CP 8	.200	0.992	1.014	1.329	1.335	1.553	1.744	1.825	1.845	1.853	1.649	1.586
CP 9	.250	0.877	0.921	0.936	0.974	1.044	1.236	1.400	1.493	1.514	1.370	1.575
CP10	.300	0.786	0.827	0.973	0.867	0.905	0.992	1.118	1.239	1.256	1.238	1.317
CP11	.399	0.639	0.676	0.729	0.745	0.759	0.760	0.797	0.870	0.903	0.915	0.992
CP12	.501	0.466	0.503	0.549	0.552	0.569	0.549	0.559	0.562	0.617	0.706	0.692
CP13	.600	0.376	0.415	0.455	0.447	0.457	0.433	0.432	0.390	0.440	0.445	0.505
CP14	.701	0.365	0.389	0.436	0.439	0.409	0.374	0.317	0.297	0.358	0.361	0.364
CP15	.800	0.176	0.163	0.188	0.198	0.191	0.171	0.142	0.134	0.150	0.197	0.235
CP16	.900	-0.095	-0.078	-0.090	-0.067	-0.086	-0.091	-0.106	-0.096	-0.117	0.005	0.020
CP17	.969	-0.130	-0.093	-0.078	-0.091	-0.091	-0.073	-0.101	-0.091	-0.078	0.077	-0.050

ALPHA		11.607	12.130	12.737	13.413	14.581	15.198	15.760	16.378
CN		0.967	0.937	0.928	0.920	0.896	0.955	0.918	0.964
CM		-0.051	-0.047	-0.063	-0.071	-0.077	-0.086	-0.075	-0.082
CP 1	.010	2.646	2.933	2.120	1.964	1.832	1.832	1.817	1.704
CP 2	.020	2.489	2.836	2.041	1.928	1.721	1.768	1.733	1.782
CP 3	.030	2.496	2.791	2.145	1.935	1.747	1.750	1.730	1.739
CP 4	.049	[illegible]	2.681	2.870	2.763	2.630	2.614	2.639	2.683
CP 5	.074	2.657	2.332	2.571	2.554	2.424	2.510	2.477	2.543
CP 6	.099	2.300	2.011	2.335	2.316	2.103	2.275	2.280	2.262
CP 7	.149	1.566	1.521	1.420	1.370	1.476	1.660	1.640	1.770
CP 8	.200	1.255	1.342	1.149	1.085	1.050	1.150	1.083	1.187
CP 9	.250	1.243	1.316	1.119	1.057	1.012	1.073	1.055	1.113
CP10	.300	1.134	1.191	1.007	0.997	0.943	1.030	0.985	1.040
CP11	.399	1.006	1.050	0.975	0.949	0.916	1.019	0.913	0.954
CP12	.501	0.811	0.866	0.937	0.861	0.787	0.867	0.834	0.868
CP13	.600	0.705	0.608	0.753	0.769	0.732	0.782	0.737	0.730
CP14	.701	0.575	0.517	0.629	0.717	0.689	0.719	0.697	0.716
CP15	.800	0.429	0.393	0.480	0.537	0.567	0.596	0.576	0.624
CP16	.900	0.136	0.125	0.165	0.147	0.312	0.218	0.215	0.239
CP17	.969	-0.031	-0.008	0.033	0.003	-0.027	0.071	-0.010	0.001

M = 0.609 Rn = 9.1 x 10^6

SOLID FLOOR AND CEILING

ALPHA		-8.219	-7.709	-7.234	-6.686	-6.201	-5.692	-5.147	-4.626	-4.113	-3.579	-3.096
CN		-0.643	-0.655	-0.632	-0.577	-0.577	-0.523	-0.466	-0.442	-0.385	-0.340	-0.283
CM		0.004	-0.020	-0.031	-0.041	-0.046	-0.045	-0.049	-0.044	-0.038	-0.034	-0.029
DCP 1	.010	-2.995	-2.931	-3.118	-3.233	-3.346	-3.440	-3.242	-3.074	-3.213	-3.422	-3.420
DCP 2	.020	-2.692	-2.657	-2.575	-3.098	-3.044	-2.905	-2.900	-2.731	-2.913	-2.536	-2.870
DCP 3	.030	-2.442	-2.634	-3.036	-2.687	-2.934	-2.751	-2.320	-2.639	-2.640	-2.531	-2.265
DCP 4	.049	-1.876	-2.465	-2.285	-2.154	-2.426	-2.490	-2.342	-2.275	-2.150	-1.842	-1.368
DCP 5	.074	-1.887	-1.911	-1.685	-1.735	-2.025	-1.995	-1.868	-1.795	-1.448	-1.114	-0.796
DCP 6	.099	-1.425	-1.666	-1.735	-1.741	-1.807	-1.677	-1.641	-1.441	-1.092	-0.795	-0.602
DCP 7	.149	-1.020	-1.258	-1.474	-1.519	-1.376	-1.178	-1.116	-1.023	-0.733	-0.591	-0.484
DCP 8	.200	-0.990	-1.242	-1.191	-1.076	-1.064	-0.927	-0.802	-0.684	-0.560	-0.490	-0.409
DCP 9	.250	-0.976	-1.116	-1.018	-0.941	-0.922	-0.811	-0.639	-0.563	-0.477	-0.405	-0.332
DCP10	.300	-0.850	-1.025	-0.805	-0.710	-0.647	-0.636	-0.485	-0.436	-0.345	-0.305	-0.250
DCP11	.399	-0.778	-0.584	-0.547	-0.455	-0.458	-0.336	-0.295	-0.297	-0.264	-0.211	-0.184
DCP12	.501	-0.529	-0.357	-0.345	-0.315	-0.282	-0.259	-0.216	-0.212	-0.200	-0.168	-0.139
DCP13	.600	-0.323	-0.219	-0.194	-0.165	-0.174	-0.077	-0.060	-0.067	-0.074	-0.084	-0.053
DCP14	.701	-0.068	-0.056	-0.058	0.057	0.076	0.071	0.082	0.075	0.065	0.071	0.092
DCP15	.800	-0.066	-0.025	0.037	0.037	0.045	0.055	0.051	0.042	0.035	0.037	0.037
DCP16	.900	-0.161	-0.094	-0.081	-0.015	-0.025	-0.031	-0.022	-0.052	-0.063	-0.076	-0.093
DCP17	.969	-0.083	-0.024	-0.015	-0.014	0.007	-0.001	0.001	-0.009	-0.022	-0.019	-0.036

ALPHA		-2.571	-2.027	-1.490	-0.964	-0.444	0.079	0.572	1.135	1.651	2.181	2.693
CN		-0.215	-0.153	-0.075	-0.005	0.069	0.140	0.218	0.292	0.368	0.448	0.523
CM		-0.026	-0.020	-0.019	-0.018	-0.016	-0.014	-0.014	-0.012	-0.011	-0.010	-0.008
DCP 1	.010	-3.367	-2.945	-2.225	-1.531	-1.010	-0.545	-0.086	0.327	0.760	1.182	1.600
DCP 2	.020	-2.698	-1.654	-1.480	-1.118	-0.760	-0.395	-0.035	0.316	0.682	1.030	1.378
DCP 3	.030	-1.605	-1.273	-1.026	-0.716	-0.417	-0.114	0.196	0.519	0.835	1.155	1.467
DCP 4	.049	-0.560	-0.783	-0.548	-0.308	-0.045	0.204	0.466	0.740	1.031	1.333	1.653
DCP 5	.074	-0.611	-0.416	-0.212	-0.008	0.210	0.433	0.669	0.887	1.130	1.376	1.652
DCP 6	.099	-0.449	-0.289	-0.113	0.061	0.260	0.443	0.634	0.824	1.034	1.248	1.474
DCP 7	.149	-0.367	-0.247	-0.103	0.013	0.157	0.290	0.429	0.575	0.718	0.860	1.005
DCP 8	.200	-0.321	-0.205	-0.106	0.009	0.123	0.242	0.351	0.463	0.586	0.650	0.812
DCP 9	.250	-0.254	-0.169	-0.077	0.014	0.118	0.217	0.309	0.412	0.512	0.607	0.702
DCP10	.300	-0.180	-0.111	-0.024	0.053	0.125	0.210	0.298	0.382	0.460	0.556	0.621
DCP11	.399	-0.119	-0.066	0.005	0.064	0.126	0.190	0.268	0.331	0.392	0.460	0.516
DCP12	.501	-0.097	-0.070	-0.010	0.044	0.090	0.140	0.186	0.241	0.291	0.347	0.392
DCP13	.600	-0.035	0.001	0.043	0.077	0.120	0.141	0.187	0.222	0.260	0.301	0.336
DCP14	.701	0.111	0.121	0.146	0.171	0.202	0.218	0.248	0.272	0.301	0.325	0.349
DCP15	.800	0.035	0.037	0.051	0.058	0.078	0.089	0.112	0.114	0.130	0.157	0.165
DCP16	.900	-0.103	-0.128	-0.121	-0.098	-0.107	-0.104	-0.098	-0.090	-0.093	-0.084	-0.076
DCP17	.969	-0.025	-0.037	-0.047	-0.042	-0.056	-0.061	-0.066	-0.067	-0.070	-0.076	-0.074

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.609 Rn = 9.1×10^6

SOLID FLOOR AND CEILING

ALPHA		3.233	3.897	4.273	4.765	5.317	5.836	6.363	6.842	7.372	7.909	8.427
CN		0.600	0.684	0.733	0.804	0.886	0.924	0.954	0.974	0.982	1.000	0.998
CM		-0.004	0.001	0.001	0.006	0.013	0.021	0.025	0.028	0.032	0.010	-0.003
DCP 1	.010	2.023	2.482	2.783	3.225	3.481	3.635	3.778	3.653	3.999	3.534	3.962
DCP 2	.020	1.709	2.065	2.266	2.615	3.036	3.237	3.395	3.490	3.614	3.601	3.647
DCP 3	.030	1.763	2.063	2.214	2.462	2.915	3.124	3.294	3.385	3.496	3.503	3.572
DCP 4	.049	1.568	2.280	2.430	2.505	2.831	3.023	3.185	3.279	3.399	3.410	3.470
DCP 5	.074	1.942	2.372	2.535	2.658	2.845	3.039	3.151	3.246	3.323	3.276	3.176
DCP 6	.099	1.777	2.286	2.587	2.751	2.910	3.062	3.126	3.153	3.091	2.880	2.650
DCP 7	.149	1.129	1.167	1.237	1.822	2.561	2.633	2.536	2.263	2.273	1.779	1.635
DCP 8	.200	0.910	1.020	1.032	1.125	1.169	1.405	1.564	1.759	1.836	1.501	1.455
DCP 9	.250	0.798	0.894	0.937	0.954	0.995	1.127	1.248	1.436	1.401	1.489	1.456
DCP10	.300	0.705	0.785	0.832	0.866	0.862	0.844	0.995	1.109	1.161	1.361	1.246
DCP11	.399	0.590	0.651	0.695	0.732	0.762	0.773	0.783	0.801	0.837	0.992	1.027
DCP12	.501	0.429	0.478	0.518	0.547	0.575	0.571	0.566	0.573	0.582	0.669	0.729
DCP13	.600	0.364	0.414	0.431	0.444	0.469	0.464	0.448	0.439	0.394	0.514	0.557
DCP14	.701	0.373	0.390	0.404	0.409	0.419	0.399	0.375	0.353	0.323	0.356	0.386
DCP15	.800	0.177	0.179	0.189	0.200	0.199	0.191	0.172	0.165	0.140	0.157	0.192
DCP16	.900	-0.076	-0.085	-0.078	-0.059	-0.063	-0.075	-0.071	-0.092	-0.066	0.002	0.068
DCP17	.969	-0.085	-0.092	-0.082	-0.091	-0.080	-0.090	-0.084	-0.079	-0.109	-0.046	-0.035

ALPHA		8.949	9.469	9.972	10.465	10.989	11.547	12.041	12.587	13.091	13.586	14.116
CN		0.991	0.943	0.985	0.994	0.902	0.946	0.885	0.900	0.972	0.981	1.056
CM		-0.015	-0.007	-0.037	-0.026	-0.032	-0.036	-0.046	-0.056	-0.055	-0.071	-0.054
DCP 1	.010	3.542	3.949	3.714	3.684	4.077	3.982	4.071	3.907	3.370	3.622	3.270
DCP 2	.020	3.668	3.683	3.674	3.641	3.654	3.085	3.636	3.470	2.734	3.124	2.576
DCP 3	.030	3.624	3.632	3.715	3.665	3.517	2.940	3.231	3.059	3.047	2.937	2.963
DCP 4	.049	3.514	3.176	3.435	3.091	2.442	2.488	2.207	2.398	2.155	2.654	2.740
DCP 5	.074	3.097	2.544	2.743	2.605	1.730	2.081	1.572	1.579	1.941	1.710	2.442
DCP 6	.099	2.500	2.214	2.386	2.399	1.634	1.975	1.439	1.501	1.893	1.661	2.349
DCP 7	.149	1.463	1.745	1.362	1.601	1.533	1.735	1.298	1.303	1.709	1.422	1.896
DCP 8	.200	1.372	1.472	1.215	1.380	1.401	1.440	1.289	1.286	1.560	1.430	1.638
DCP 9	.250	1.339	1.332	1.198	1.323	1.226	1.297	1.174	1.237	1.483	1.298	1.501
DCP10	.300	1.200	1.152	1.128	1.241	1.136	1.254	1.091	1.072	1.278	1.240	1.396
DCP11	.399	0.977	0.957	0.959	1.059	0.979	1.036	1.051	0.972	1.066	1.101	1.155
DCP12	.501	0.769	0.681	0.813	0.810	0.814	0.776	0.847	0.828	0.779	0.919	0.834
DCP13	.600	0.600	0.534	0.665	0.605	0.591	0.650	0.646	0.735	0.693	0.768	0.735
DCP14	.701	0.469	0.378	0.492	0.502	0.462	0.494	0.499	0.582	0.586	0.654	0.586
DCP15	.800	0.276	0.248	0.386	0.312	0.315	0.322	0.361	0.374	0.418	0.439	0.434
DCP16	.900	0.074	0.044	0.171	0.094	0.089	0.086	0.119	0.116	0.135	0.179	0.154
DCP17	.969	-0.028	-0.035	0.049	-0.049	-0.065	-0.050	-0.042	0.024	-0.010	0.047	-0.016

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.609 Rn = 9.1 x 10^6 SOLID FLOOR AND CEILING

ALPHA		14.666	15.169	15.649	16.176	16.720
CN		1.061	1.081	1.063	1.083	1.086
CM		-0.070	-0.078	-0.083	-0.087	-0.090
DCP 1	.010	3.492	3.375	3.617	3.125	3.249
DCP 2	.020	2.630	3.030	3.340	2.411	2.935
DCP 3	.030	2.594	2.593	1.563	3.028	3.114
DCP 4	.049	2.377	2.563	2.484	2.530	2.426
DCP 5	.074	2.173	2.242	2.185	2.190	2.189
DCP 6	.099	2.098	2.138	2.211	2.178	2.002
DCP 7	.149	1.833	1.855	1.572	1.855	1.758
DCP 8	.200	1.644	1.646	1.803	1.604	1.623
DCP 9	.250	1.480	1.446	1.194	1.390	1.541
DCP10	.300	1.334	1.301	1.085	1.292	1.370
DCP11	.399	1.188	1.158	1.075	1.122	1.045
DCP12	.501	0.964	1.020	0.927	1.032	0.925
DCP13	.600	0.773	0.845	0.824	0.857	0.825
DCP14	.701	0.664	0.672	0.757	0.746	0.757
DCP15	.800	0.482	0.495	0.605	0.562	0.601
DCP16	.900	0.179	0.224	0.239	0.254	0.309
DCP17	.969	0.024	0.022	0.026	0.017	0.061

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.705 Rn = 10.0 x 10^6

SOLID FLOOR AND CEILING

ALPHA		-9.601	-8.983	-8.442	-7.861	-7.245	-6.661	-6.104	-5.490	-4.832	-4.278	-3.652
CN		-0.671	-0.682	-0.702	-0.762	-0.734	-0.684	-0.645	-0.578	-0.534	-0.469	-0.357
CM		0.034	0.026	-0.035	0.011	0.004	-0.028	-0.046	-0.053	-0.051	-0.045	-0.038
DCP 1	.010	-1.917	-2.910	-3.136	-3.137	-3.257	-3.215	-3.271	-3.190	-3.154	-3.058	-2.957
DCP 2	.020	-2.798	-2.846	-2.879	-2.932	-2.977	-3.102	-3.120	-3.053	-3.014	-2.897	-2.772
DCP 3	.030	-2.530	-2.480	-2.671	-2.390	-2.294	-2.827	-2.801	-2.716	-2.786	-2.672	-2.537
DCP 4	.049	-2.199	-2.255	-2.346	-2.739	-2.681	-2.622	-2.595	-2.505	-2.429	-2.289	-2.122
DCP 5	.074	-1.763	-1.836	-1.862	-2.438	-2.378	-2.323	-2.288	-2.189	-2.100	-1.967	-1.784
DCP 6	.099	-1.656	-1.649	-1.708	-2.200	-2.188	-2.089	-2.100	-2.071	-1.935	-1.793	-1.607
DCP 7	.149	-1.410	-1.417	-1.444	-1.794	-1.885	-1.476	-1.333	-1.763	-1.750	-1.612	-0.395
DCP 8	.200	-0.707	-0.717	-1.118	-1.005	-1.016	-0.972	-1.100	-1.021	-1.076	-0.631	-0.324
DCP 9	.250	-0.680	-0.732	-1.112	-0.899	-0.710	-0.962	-1.097	-0.745	-0.691	-0.337	-0.298
DCP10	.300	-0.618	-0.709	-0.960	-0.727	-0.613	-0.881	-0.917	-0.494	-0.366	-0.243	-0.242
DCP11	.399	-0.616	-0.610	-0.720	-0.551	-0.512	-0.481	-0.622	-0.477	-0.212	-0.221	-0.194
DCP12	.501	-0.586	-0.570	-0.467	-0.519	-0.518	-0.444	-0.385	-0.318	-0.179	-0.190	-0.159
DCP13	.600	-0.426	-0.378	-0.343	-0.444	-0.466	-0.244	-0.136	-0.111	-0.102	-0.099	-0.070
DCP14	.701	-0.225	-0.242	-0.134	-0.182	-0.194	-0.231	0.087	0.101	0.076	0.077	0.094
DCP15	.800	-0.239	-0.187	-0.068	-0.252	-0.196	0.011	0.087	0.098	0.029	0.018	0.071
DCP16	.900	-0.342	-0.353	-0.135	-0.265	-0.201	-0.070	-0.063	-0.038	-0.111	-0.133	-0.125
DCP17	.969	-0.144	-0.118	-0.020	-0.122	-0.090	-0.055	-0.004	-0.024	-0.031	-0.038	-0.026

ALPHA		-3.037	-2.465	-1.858	-1.188	-0.584	-0.021	0.604	1.257	1.810	2.401	3.066
CN		-0.270	-0.183	-0.104	-0.024	0.059	0.143	0.230	0.302	0.395	0.492	0.580
CM		-0.033	-0.030	-0.025	-0.021	-0.019	-0.016	-0.015	-0.013	-0.010	-0.005	-0.004
DCP 1	.010	-2.814	-2.586	-2.360	-1.998	-1.270	-0.754	-0.329	0.081	0.428	0.769	1.087
DCP 2	.020	-2.598	-2.367	-2.058	-1.347	-0.960	-0.537	-0.175	0.158	0.470	0.761	1.072
DCP 3	.030	-2.339	-2.083	-1.680	-0.873	-0.583	-0.257	0.055	0.351	0.615	0.858	1.083
DCP 4	.049	-1.913	-1.593	-0.576	-0.419	-0.142	0.136	0.416	0.690	0.965	1.159	1.356
DCP 5	.074	-1.482	-0.318	-0.244	-0.052	0.186	0.438	0.729	0.942	1.132	1.332	1.533
DCP 6	.099	-0.468	-0.249	-0.164	0.017	0.239	0.472	0.745	1.066	1.272	1.450	1.633
DCP 7	.149	-0.300	-0.265	-0.139	0.005	0.159	0.327	0.513	0.489	1.206	1.463	1.625
DCP 8	.200	-0.314	-0.249	-0.137	-0.007	0.120	0.248	0.388	0.518	0.510	1.360	1.575
DCP 9	.250	-0.273	-0.208	-0.106	0.001	0.108	0.223	0.335	0.450	0.506	0.515	1.107
DCP10	.300	-0.207	-0.136	-0.050	0.034	0.130	0.226	0.320	0.418	0.487	0.504	0.546
DCP11	.399	-0.155	-0.090	-0.030	0.048	0.125	0.199	0.277	0.346	0.408	0.457	0.464
DCP12	.501	-0.112	-0.066	-0.017	0.032	0.087	0.148	0.233	0.259	0.314	0.349	0.374
DCP13	.600	-0.033	0.009	0.039	0.077	0.114	0.158	0.202	0.233	0.280	0.310	0.333
DCP14	.701	0.124	0.156	0.172	0.191	0.219	0.245	0.277	0.297	0.324	0.336	0.359
DCP15	.800	0.040	0.052	0.059	0.072	0.081	0.094	0.106	0.118	0.128	0.142	0.157
DCP16	.900	-0.119	-0.110	-0.118	-0.129	-0.121	-0.133	-0.131	-0.128	-0.122	-0.122	-0.106
DCP17	.969	-0.025	-0.021	-0.025	-0.039	-0.051	-0.057	-0.061	-0.070	-0.071	-0.082	-0.073

M = 0.705 Rn = 10.0 x 10^6

SOLID FLOOR AND CEILING

ALPHA		3.609	4.231	4.871	5.490	6.061	6.648	7.290	7.854	8.447	9.099	9.720
CN		0.673	0.782	0.835	0.825	0.848	0.867	0.893	0.921	0.910	0.891	0.875
CM		-0.001	-0.001	0.002	0.008	0.007	0.002	-0.001	-0.005	-0.006	-0.027	-0.035
DCP 1	.010	1.374	1.614	1.836	1.998	2.111	2.260	2.381	2.464	2.575	2.647	2.680
DCP 2	.020	1.252	1.453	1.611	1.723	1.833	1.979	2.131	2.231	2.367	2.457	2.404
DCP 3	.030	1.277	1.424	1.556	1.660	1.740	1.983	2.039	2.146	2.260	2.357	2.401
DCP 4	.049	1.549	1.668	1.773	1.854	1.902	1.966	2.076	2.174	2.270	2.365	2.379
DCP 5	.074	1.692	1.805	1.925	1.999	2.034	2.089	2.165	2.234	2.320	2.396	2.422
DCP 6	.099	1.793	1.902	2.008	2.077	2.115	2.157	2.221	2.279	2.355	2.410	2.411
DCP 7	.149	1.776	1.886	1.981	2.042	2.086	2.131	2.175	2.218	2.271	2.119	1.975
DCP 8	.200	1.719	1.824	1.919	1.985	2.021	2.069	2.118	2.139	1.968	1.187	1.053
DCP 9	.250	1.666	1.776	1.875	1.936	1.927	1.696	1.570	1.544	1.387	1.143	0.973
DCP10	.300	0.902	1.668	1.686	1.195	1.193	1.199	1.243	1.248	1.279	0.992	0.932
DCP11	.399	0.439	0.730	0.928	0.965	0.959	1.000	0.952	0.998	1.048	0.946	0.916
DCP12	.501	0.372	0.343	0.510	0.630	0.617	0.661	0.718	0.738	0.792	0.752	0.686
DCP13	.600	0.349	0.315	0.264	0.308	0.439	0.450	0.503	0.535	0.485	0.608	0.648
DCP14	.701	0.363	0.347	0.286	0.212	0.240	0.270	0.303	0.321	0.318	0.422	0.473
DCP15	.800	0.165	0.159	0.139	0.085	0.112	0.097	0.122	0.121	0.167	0.271	0.327
DCP16	.900	-0.099	-0.106	-0.114	-0.126	-0.114	-0.106	-0.118	-0.070	-0.047	0.060	0.101
DCP17	.969	-0.070	-0.069	-0.089	-0.079	-0.076	-0.091	-0.060	-0.048	-0.082	-0.001	0.007

ALPHA		10.290	10.818	11.511	12.116	12.619	13.264	13.880	14.469	15.090	15.656	17.507
CN		0.913	0.931	0.968	0.929	0.945	0.970	0.990	1.003	1.036	1.048	1.097
CM		-0.036	-0.044	-0.039	-0.049	-0.052	-0.054	-0.057	-0.064	-0.070	-0.073	-0.109
DCP 1	.010	2.770	2.848	2.920	2.929	2.998	3.073	3.078	3.141	3.199	3.226	2.702
DCP 2	.020	2.600	2.692	2.787	2.783	2.967	2.954	2.980	3.041	3.116	3.173	2.564
DCP 3	.030	2.501	2.578	2.669	2.679	2.755	2.843	2.876	2.942	2.994	3.006	2.839
DCP 4	.049	2.472	2.543	2.541	2.636	2.709	2.753	2.776	2.767	2.769	2.709	1.881
DCP 5	.074	2.408	2.561	2.346	2.607	2.622	2.647	2.661	2.643	2.600	2.529	1.863
DCP 6	.099	2.473	2.468	2.192	2.461	2.477	2.456	2.487	2.446	2.400	2.324	1.754
DCP 7	.149	2.056	1.980	1.912	1.907	1.971	2.080	2.133	2.171	2.176	2.195	1.671
DCP 8	.200	1.135	1.133	1.634	1.055	1.038	1.056	1.100	1.042	1.137	1.147	1.763
DCP 9	.250	1.071	1.042	1.436	1.014	0.976	1.051	1.054	1.076	1.099	1.148	1.723
DCP10	.300	0.990	0.987	1.229	0.906	0.934	0.958	1.000	0.969	1.035	1.092	1.463
DCP11	.399	0.930	0.950	0.951	0.905	0.907	0.868	0.914	0.938	0.977	1.024	1.256
DCP12	.501	0.745	0.771	0.782	0.713	0.684	0.842	0.769	0.743	0.908	0.893	0.931
DCP13	.600	0.638	0.595	0.588	0.671	0.700	0.705	0.677	0.731	0.732	0.781	0.854
DCP14	.701	0.503	0.574	0.564	0.620	0.559	0.581	0.642	0.691	0.718	0.728	0.838
DCP15	.800	0.339	0.381	0.377	0.431	0.555	0.455	0.565	0.569	0.573	0.562	0.664
DCP16	.900	0.120	0.184	0.066	0.176	0.208	0.225	0.233	0.270	0.268	0.270	0.342
DCP17	.969	-0.019	0.005	0.005	0.016	-0.019	0.055	-0.022	0.014	0.010	0.015	0.027

AIRFOIL NLR 7223-62 STEADY FORCES AND MOMENTS

M = 0.705 Rn = 10.0 x 10^6 SOLID FLOOR AND CEILING

ALPHA		18.140	18.696	19.276	19.903
CN		1.068	1.138	1.180	1.199
CM		-0.115	-0.123	-0.136	-0.146
DCP 1	.010	2.527	2.659	2.721	2.643
DCP 2	.020	2.467	2.607	2.634	2.635
DCP 3	.030	2.855	2.692	2.630	2.598
DCP 4	.049	1.724	1.785	1.824	1.865
DCP 5	.074	1.661	1.724	1.741	1.789
DCP 6	.099	1.591	1.659	1.699	1.707
DCP 7	.145	1.480	1.577	1.642	1.596
DCP 8	.200	1.696	1.734	1.759	1.767
DCP 9	.250	1.774	1.787	1.818	1.802
DCP10	.300	1.506	1.613	1.617	1.637
DCP11	.399	1.101	1.361	1.427	1.404
DCP12	.501	0.913	1.079	1.155	1.182
DCP13	.600	0.883	1.003	1.050	1.056
DCP14	.701	0.854	0.843	0.879	0.961
DCP15	.800	0.717	0.699	0.706	0.754
DCP16	.900	0.381	0.297	0.373	0.411
DCP17	.969	-0.076	0.007	0.075	0.118

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                      FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         22.89       0.155         0.218        2.61         0.0          0.05       12099.1       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,MAX   AERO DAMP    TDR          EXT DAMP
                75.2         14163       0.35E 07    -0.040        0.320        2.62       -0.00125      0.769        0.0
              (246.6)      (295.8)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               0.050      2.607   0    0.059 357    0.061 218    0.020 130    0.015  35    0.021  46    0.013 159    0.035  33    0.009 346
CN                  0.139      0.169 359    0.009 282    0.009 167    0.005 232    0.002 229    0.004  68    0.002 161    0.017  10    0.002  34
CM                 -0.024      0.010 300    0.001  46    0.001 331    0.002  50    0.002   4    0.001 268    0.001  79    0.005 202    0.000 359

DCP 1     .010     -0.482      1.327 346    0.026 343    0.014 158    0.012 229    0.017 274    0.008 338    0.013  10    0.028 323    0.017  31
DCP 2     .020     -0.311      0.909 349    0.032 282    0.007 299    0.006 355    0.001 355    0.010  67    0.003 284    0.027 345    0.013  36
DCP 3     .030      0.046      0.781 349    0.020 293    0.006 197    0.002 126    0.001 256    0.014  38    0.006  62    0.016 332    0.007  44
DCP 4     .049      0.308      0.633 349    0.010 310    0.012 146    0.007 308    0.006 197    0.005 207    0.006  67    0.017 343    0.002  13
DCP 5     .074      0.126      0.502 350    0.010 306    0.009 167    0.009 222    0.009 308    0.004 353    0.006  97    0.011 349    0.010  58
DCP 6     .099      0.350      0.426 352    0.006   8    0.011 146    0.033 329    0.009 241    0.005   9    0.006 101    0.009 339    0.014  17
DCP 7     .149      0.241      0.323 354    0.009 284    0.007 158    0.005 301    0.007 222    0.007  55    0.006 354    0.018   0    0.005   5
DCP 8     .200      0.231      0.262 358    0.006   1    0.018 154    0.007  91    0.010 331    0.006  43    0.006  81    0.014 332    0.009  29
DCP 9     .250      0.209      0.223 357    0.009  46    0.012 165    0.014 254    0.009 306    0.006 355    0.005  98    0.023 357    0.001 251
DCP10     .300      0.213      0.188 358    0.003 321    0.009 165    0.003 267    0.006 299    0.007 204    0.006  84    0.018  27    0.005 146
DCP11     .399      0.206      0.150   9    0.011 286    0.011 278    0.003  77    0.006 115    0.004  49    0.011 177    0.019   9    0.007 223
DCP12     .501      0.129      0.113  19    0.006 313    0.015 141    0.006 203    0.010 129    0.011  64    0.006  63    0.022   5    0.003 252
DCP13     .600      0.192      0.082  16    0.008 317    0.012 183    0.017 207    0.011 284    0.012  64    0.007 121    0.022  18    0.010 359
DCP14     .701      0.203      0.057  29    0.006 116    0.007 212    0.012 249    0.005 170    0.004 226    0.035 277    0.018  29    0.009 105
DCP15     .800      0.158      0.039  38    0.012 203    0.001  77    0.006 193    0.003 152    0.013 156    0.006 255    0.022  78    0.035 156
DCP16     .900     -0.057      0.015  85    0.005 299    0.010 110    0.008 336    0.008  62    0.010  87    0.004 350    0.019  18    0.006  56
DCP17     .969      0.023      0.014 133    0.018 235    0.036 111    0.008 290    0.017 250    0.012 347    0.023 186    0.021   6    0.012 286

                      FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         22.89       0.162         0.210        2.61         0.0          2.45       12099.2       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,MAX   AERO DAMP    TDR          EXT DAMP
                71.9         13205       0.34E 07    -0.034        0.540        5.03       -0.00113      0.667        0.0
              (235.8)      (275.8)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.449      2.609   0    0.059 357    0.062 220    0.015 130    0.018 357    0.022  33    0.014 127    0.004 193    0.010 331
CN                  0.348      0.185 356    0.003 330    0.002  99    0.003 286    0.003 258    0.001 305    0.001 177    0.006   3    0.031  98
CM                 -0.029      0.008 299    0.001  89    0.001  49    0.002 359    0.001 133    0.001 112    0.001 117    0.001 146    0.001 180

DCP 1     .010      0.978      1.267 345    0.028  32    0.013  18    0.008 206    0.017 196    0.014  78    0.011  80    0.022 356    0.007 169
DCP 2     .020      0.687      0.996 348    0.013  16    0.012  80    0.037  63    0.015 241    0.010  79    0.038  99    0.013  36    0.013 153
DCP 3     .030      0.866      0.841 348    0.010  16    0.019  32    0.002  12    0.007 205    0.007  52    0.008 169    0.014  99    0.009 146
DCP 4     .049      0.731      0.693 349    0.007 291    0.016  53    0.003 244    0.002 351    0.006  82    0.007 160    0.021  69    0.005 230
DCP 5     .074      0.727      0.561 349    0.006 320    0.006 122    0.005  69    0.009 260    0.003 117    0.009 151    0.008  19    0.006 147
DCP 6     .099      0.876      0.453 352    0.003  70    0.008  80    0.007 214    0.004 274    0.006 341    0.005  88    0.010  72    0.007 137
DCP 7     .149      0.627      0.369 351    0.007 291    0.015  85    0.008 340    0.007 226    0.000  46    0.001 139    0.013  17    0.011 139
DCP 8     .200      0.566      0.284 356    0.011 103    0.016  56    0.007 199    0.009 261    0.006 108    0.001 157    0.010  33    0.012 131
DCP 9     .250      0.460      0.236 355    0.007 307    0.008 165    0.008 299    0.002 245    0.010 159    0.009 177    0.007 161    0.004 244
DCP10     .300      0.457      0.203 358    0.007 330    0.038 157    0.008 314    0.002 145    0.007 289    0.005 165    0.006   7    0.008 107
DCP11     .399      0.391      0.166   5    0.006 269    0.006 139    0.009 227    0.002 229    0.007 326    0.006 166    0.007 319    0.005 230
DCP12     .501      0.269      0.116   6    0.006 342    0.006 331    0.005 196    0.005 209    0.002 246    0.006  27    0.015  26    0.010 315
DCP13     .600      0.301      0.087  19    0.006 119    0.036 258    0.036  15    0.007 218    0.006 235    0.039 169    0.012 337    0.006 287
DCP14     .701      0.276      0.064  23    0.038 291    0.006  60    0.005  86    0.008 325    0.003 313    0.011 305    0.005 355    0.001 333
DCP15     .800      0.169      0.041  26    0.009 277    0.003 207    0.009 161    0.008 318    0.005  42    0.038 183    0.010 327    0.003 106
DCP16     .900     -0.069      0.017  57    0.038 196    0.009 148    0.018 179    0.002 136    0.007 274    0.017 337    0.006 261    0.008  16
DCP17     .969      0.012      0.004 165    0.036   3    0.007 336    0.013 295    0.006 340    0.002 283    0.007 137    0.005  88    0.008  68
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNNEL HZ    DRIVE HZ    K           MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                 7.0         22.89       0.168       0.203        7.60         0.0          4.95       12093.3       20

               V            Q            RN          CM(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TSR          EXT DAMP
                 69.2        12334        0.32E 07   -0.037        0.778        7.99       -0.00164      0.991        0.0
               (227.1)      (257.6)
                                                                  HARMONIC  ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.950     7.607   0    0.061   4    0.061 318    0.021 172    0.018  11    0.026  33    0.012 151    0.007 127    0.010   0
CN                  0.589     0.191 359    0.031 322    0.038  69    0.009 152    0.003 277    0.007  80    0.001  99    0.036 309    0.007  26
CM                 -0.016     0.011 292    0.001 344    0.002 245    0.001   5    0.001  42    0.001 279    0.002  14    0.002 288    0.002 217

DCP 1     .010      2.676     1.297 345    0.026  39    0.012 136    0.015 126    0.016 243    0.002 335    0.071  19    0.050 285    0.021   3
DCP 2     .020      1.938     1.302 348    0.013 356    0.018 132    0.011  86    0.015 282    0.011 312    0.029   8    0.050 285    0.017  25
DCP 3     .030      1.881     0.874 349    0.015  70    0.014 109    0.007  99    0.002 270    0.005  51    0.017  16    0.035 297    0.012 344
DCP 4     .049      1.676     0.719 349    0.018 338    0.003 115    0.037 196    0.006 153    0.013 269    0.017  48    0.032 299    0.016  20
DCP 5     .074      1.442     0.579 349    0.016 304    0.036  97    0.009 224    0.008 291    0.008 349    0.029  26    0.029 296    0.006  50
DCP 6     .100      1.468     0.468 351    0.019 288    0.018 117    0.005 246    0.036 270    0.038 290    0.016  31    0.028 295    0.009  60
DCP 7     .149      1.075     0.361 353    0.015 299    0.013 353    0.056  58    0.010 328    0.003 349    0.012  19    0.036 291    0.011 321
DCP 8     .200      0.919     0.298 356    0.006 299    0.008 315    0.009 114    0.009 317    0.007 170    0.011   8    0.040 278    0.010  10
DCP 9     .250      0.786     0.248 359    0.008  58    0.005 117    0.005  13    0.009 182    0.034 326    0.012  56    0.039  56    0.008  58
DCP10     .300      0.721     0.201   1    0.006  60    0.013  39    0.007  65    0.007 352    0.055  37    0.003 337    0.007 206    0.005  30
DCP11     .399      0.676     0.171   9    0.005 137    0.021  87    0.006  26    0.011 265    0.007 172    0.013 226    0.039 150    0.008 356
DCP12     .501      0.417     0.131   8    0.005 167    0.009  51    0.005 170    0.001 275    0.013 118    0.031 164    0.036  67    0.035  60
DCP13     .600      0.412     0.109  14    0.036  56    0.015  65    0.004 144    0.006 167    0.038 114    0.003 349    0.005  89    0.038  90
DCP14     .701      0.372     0.067  33    0.009 356    0.008  51    0.007 156    0.009 196    0.012  49    0.030 158    0.038 189    0.016  11
DCP15     .800      0.182     0.065  61    0.007  32    0.005 233    0.006 136    0.011 292    0.033 139    0.009 183    0.035 110    0.036  36
DCP16     .900     -0.061     0.027  73    0.016 191    0.019  89    0.015 257    0.006  77    0.033 190    0.006 270    0.015  70    0.003  88
DCP17     .949      0.009     0.024 116    0.003 300    0.005  11    0.013 153    0.012 289    0.035 317    0.036 196    0.006 159    0.017  90
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNNEL HZ    DRIVE HZ    K           MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                 7.0         22.92       0.172       0.199        7.60         0.0          7.42       12093.4       20

               V            Q            RN          CM(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TSR          EXT DAMP
                 67.9        11893        0.32E 07   -0.021        1.009       10.06       -0.00139      0.770        0.0
               (222.7)      (248.4)
                                                                  HARMONIC  ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.422     7.605   0    0.066   0    0.066 227    0.022 127    0.021  20    0.028  41    0.012 157    0.007 133    0.010 344
CN                  0.818     0.197 358    0.003  40    0.002  56    0.002 269    0.005 260    0.002 105    0.001 264    0.005  59    0.001 170
CM                 -0.009     0.011 359    0.001 322    0.001 287    0.001 267    0.001  61    0.001 295    0.001 124    0.021 283    0.001  16

DCP 1     .019      3.071     1.269 346    0.052  45    0.063 312    0.041 318    0.007 257    0.006 144    0.016 128    0.020 351    0.036 125
DCP 2     .029      3.133     1.947 348    0.070   7    0.017 326    0.006   2    0.027 285    0.039  37    0.008 301    0.025 351    0.006  89
DCP 3     .030      3.019     0.895 349    0.015 313    0.034 298    0.037 354    0.006 262    0.009  99    0.003 113    0.038  13    0.001 267
DCP 4     .049      2.682     0.778 349    0.011 353    0.006 255    0.009 268    0.006 323    0.014 168    0.017 168    0.023  14    0.010 128
DCP 5     .074      2.156     0.556 348    0.019   8    0.032 135    0.003 219    0.002 125    0.004 358    0.011 114    0.020  35    0.006  74
DCP 6     .098      2.060     0.494 351    0.013   6    0.037 140    0.004 154    0.007 294    0.004 319    0.006 170    0.016 350    0.009  76
DCP 7     .148      1.531     0.362 353    0.016   7    0.005  92    0.007 295    0.015 250    0.006  51    0.010 278    0.011  37    0.006  77
DCP 8     .200      1.749     0.298 357    0.016  48    0.006 291    0.008 303    0.018 337    0.006 329    0.011 167    0.018  44    0.002 358
DCP 9     .250      1.545     0.262 358    0.006 129    0.005 155    0.008 199    0.006 290    0.003 123    0.007  36    0.005  42    0.009 345
DCP10     .300      0.877     0.209   1    0.038 192    0.036 351    0.005 252    0.005  96    0.035 118    0.013 166    0.004 356    0.003 287
DCP11     .399      0.892     0.165   8    0.035 342    0.035  63    0.008 296    0.005 226    0.010 112    0.036 289    0.011  83    0.006 228
DCP12     .501      0.571     0.132  13    0.006 257    0.009 159    0.009 321    0.019 268    0.008 320    0.002 297    0.011 134    0.003  38
DCP13     .600      0.516     0.106  22    0.007 187    0.011  68    0.036 244    0.036 212    0.004 236    0.039 270    0.010 158    0.008 288
DCP14     .701      0.473     0.053  33    0.038 135    0.031  81    0.006 140    0.005 215    0.007 177    0.003 136    0.008 158    0.009 160
DCP15     .800      0.336     0.060  43    0.006 131    0.007  60    0.009 131    0.006 267    0.004 195    0.005 308    0.006 242    0.007 186
DCP16     .900     -0.328     0.016  31    0.038 355    0.036  31    0.007 343    0.012 241    0.039  69    0.019 301    0.019  27    0.036 314
DCP17     .945     -0.216     0.005 235    0.038  96    0.036 321    0.009 137    0.001 196    0.012 110    0.005 333    0.010  90    0.012 113
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                     FORCED PITCHING OSCILLATION             AIRFOIL     NLR 1

          [illegible]  [illegible]  K            MACH NO      DEL.ALPHA    DEL.H     ALPHA.0      TEST POINT   CYCLES ANALYZED
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  0.0       [illegible]  [illegible]  [illegible]

          V             Q           RN            CN(MIN)      CN(MAX)      ALPHA,CNMAX  AERO DAMP    TPR          TOT TEMP
            67.4         11769      [illegible]   -0.021       1.727        12.92        -0.00144     [illegible]  0.0
          (221.3)       (245.8)
                                                       HARMONIC ANALYSIS
DATA
TYPE    X/C   RES 0  RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA   [illegible]
CN      [illegible]
CM      [illegible]

PCP 1   [illegible]
PCP 2   [illegible]
PCP 3   [illegible]
PCP 4   [illegible]
PCP 5   [illegible]
PCP 6   [illegible]
PCP 7   [illegible]
PCP 8   [illegible]
PCP 9   [illegible]
PCP10   [illegible]
PCP11   [illegible]
PCP12   [illegible]
PCP13   [illegible]
PCP14   [illegible]
PCP15   [illegible]
PCP16   [illegible]
PCP17   [illegible]

                     FORCED PITCHING OSCILLATION             AIRFOIL     NLR 1

          [illegible]  [illegible]  K            MACH NO      DEL.ALPHA    DEL.H     ALPHA.0      TEST POINT   CYCLES ANALYZED
          [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  0.0       12.75        [illegible]  [illegible]

          V             Q           RN            CN(MIN)      CN(MAX)      ALPHA,CNMAX  AERO DAMP    TPR          TOT TEMP
            67.0         11630      [illegible]   -0.011       1.477        15.05        -0.00154     [illegible]  0.0
          (219.9)       (242.9)
                                                       HARMONIC ANALYSIS
DATA
TYPE    X/C   RES 0  RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA   [illegible]
CN      [illegible]
CM      [illegible]

PCP 1   [illegible]
PCP 2   [illegible]
PCP 3   [illegible]
PCP 4   [illegible]
PCP 5   [illegible]
PCP 6   [illegible]
PCP 7   [illegible]
PCP 8   [illegible]
PCP 9   [illegible]
PCP10   [illegible]
PCP11   [illegible]
PCP12   [illegible]
PCP13   [illegible]
PCP14   [illegible]
PCP15   [illegible]
PCP16   [illegible]
PCP17   [illegible]
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA  DEL.H     ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0       22.98      0.174       0.197       2.56       0.0       14.86     12093.7      20

              V          Q           RN         CN(MIN)     CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
                67.3       11735     0.32E 07  -0.151       1.612      17.46      0.00657   -2.522       0.0
              (220.7)    (245.1)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             14.862   2.555   0   0.101   6   0.081 236   0.036 124   0.030   6   0.025  81   0.018 155   0.006  12   0.012 355
CN                 1.183   0.606  42   0.103 256   0.069 129   0.031 345   0.010 249   0.036  65   0.002 150   0.019  11   0.003 268
CM                -0.021   0.053 147   0.038   4   0.020 258   0.015 133   0.005  18   0.036 257   0.001 161   0.006 216   0.001 326

DCP 1    .010      5.407   1.725  82   0.781  15   0.352 321   0.266 224   0.174 138   0.094  53   0.070 327   0.094 280   0.038 176
DCP 2    .020      4.735   1.593  79   0.595 357   0.217 286   0.164 217   0.124 135   0.095  45   0.063 328   0.088 282   0.032 173
DCP 3    .030      4.670   1.526  71   0.673 333   0.272 226   0.162 162   0.123  65   0.077 336   0.060 215   0.006 205   0.033  12
DCP 4    .049      3.503   1.229  89   0.516  11   0.179 296   0.030 187   0.039 234   0.036 162   0.025 120   0.009   1   0.015   7
DCP 5    .074      2.961   1.122  81   0.621 344   0.128 238   0.041 125   0.013 271   0.012  75   0.005 267   0.023 316   0.007 114
DCP 6    .099      2.706   1.029  72   0.365 321   0.124 213   0.066 125   0.021  15   0.017 346   0.016 266   0.011 319   0.004 253
DCP 7    .149      2.157   0.861  56   0.319 282   0.109 180   0.088  97   0.035 355   0.032 330   0.070 228   0.028 279   0.021  82
DCP 8    .200      1.851   0.763  42   0.296 271   0.142 171   0.084  77   0.026  17   0.035 318   0.011 241   0.032 306   0.036 350
DCP 9    .250      1.615   0.596  37   0.291 246   0.135 163   0.086  15   0.095 340   0.024 325   0.081 129   0.054 107   0.027 264
DCP10    .300      1.446   0.546  28   0.236 244   0.126 136   0.085  26   0.052 284   0.033 211   0.027 140   0.035  35   0.036 310
DCP11    .399      1.188   0.467  24   0.189 229   0.110 126   0.080   6   0.053 265   0.029 175   0.030  79   0.053  13   0.026 276
DCP12    .501      0.864   0.357  18   0.157 212   0.133 106   0.074 338   0.035 236   0.025 136   0.009  34   0.023   9   0.021 206
DCP13    .600      0.688   0.286  17   0.144 203   0.088  92   0.071 324   0.027 231   0.022 112   0.023 305   0.013   0   0.016 157
DCP14    .701      0.562   0.223  10   0.130 193   0.078  75   0.074 303   0.037 162   0.023  62   0.014 286   0.015  42   0.007 125
DCP15    .800      0.381   0.171 351   0.103 171   0.064  57   0.059 296   0.023 175   0.030  44   0.008 274   0.019  56   0.010  66
DCP16    .900      0.099   0.141 326   0.073 160   0.065  48   0.038 278   0.017 135   0.015  10   0.003 255   0.030  17   0.009  24
DCP17    .969      0.050   0.070 330   0.042 188   0.025  30   0.025 277   0.008 318   0.038  26   0.006   2   0.015  28   0.037 153

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA  DEL.H     ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0       22.96      0.173       0.199       2.54       0.0       17.37     12033.9      20

              V          Q           RN         CN(MIN)     CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
                67.6       11870     0.32E 07  -0.256       1.909      19.69      0.00054   -0.008       0.0
              (221.9)    (247.9)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             17.374   2.518   0   0.054  31   0.031 176   0.027  11   0.018 293   0.021  78   0.007 115   0.006 249   0.013 302
CN                 1.191   0.608  62   0.127 353   0.077 296   0.055 207   0.028 127   0.019  52   0.008 303   0.006 183   0.005 157
CM                -0.068   0.083 178   0.063 117   0.026  56   0.020 332   0.011 260   0.038 175   0.003 111   0.001 115   0.002 336

DCP 1    .010      6.250   1.976 126   0.587 130   0.337 105   0.171  98   0.360  70   0.143  44   0.111  15   0.067  15   0.053 360
DCP 2    .020      3.726   1.785 119   0.307 127   0.236  96   0.060  96   0.114  79   0.096  29   0.064   7   0.031 273   0.019 350
DCP 3    .030      3.570   1.655 110   0.206  83   0.203  32   0.095 312   0.007 268   0.018 357   0.015 332   0.032 317   0.007 136
DCP 4    .049      3.166   1.137 125   0.680  82   0.186  16   0.086 342   0.006  76   0.037  51   0.033 313   0.061 310   0.011 132
DCP 5    .074      2.620   1.026 113   0.366  63   0.166 356   0.088 315   0.009 175   0.021  12   0.017 263   0.061 198   0.013 169
DCP 6    .099      2.383   0.909 100   0.257  52   0.167 351   0.095 299   0.016 259   0.011 340   0.026 261   0.063 292   0.015 150
DCP 7    .149      1.956   0.770  77   0.222  44   0.219 330   0.141 275   0.068 216   0.016 200   0.030 298   0.053 177   0.038 133
DCP 8    .200      1.737   0.686  70   0.264  27   0.207 331   0.161 276   0.076 238   0.021 186   0.070 333   0.036 168   0.026 128
DCP 9    .250      1.566   0.617  59   0.251   8   0.171 315   0.158 246   0.006 190   0.072 159   0.068 123   0.053  96   0.038  39
DCP10    .300      1.473   0.563  52   0.230 350   0.156 298   0.125 220   0.057 178   0.066 125   0.035  75   0.038  63   0.015 356
DCP11    .399      1.290   0.494  45   0.227 346   0.121 290   0.115 211   0.047 169   0.070 120   0.035  60   0.033  67   0.032 291
DCP12    .501      0.993   0.451  38   0.238 335   0.135 271   0.137 196   0.066 132   0.051  76   0.032   2   0.026 332   0.026 233
DCP13    .600      0.813   0.305  29   0.186 318   0.116 261   0.103 178   0.054 111   0.050  36   0.063 316   0.025 330   0.035 208
DCP14    .701      0.675   0.263  18   0.165 307   0.113 261   0.097 156   0.068  85   0.063   3   0.012 285   0.025 263   0.020 141
DCP15    .800      0.480   0.187   3   0.154 285   0.095 216   0.081 130   0.054  57   0.068 336   0.026 257   0.016 201   0.021 111
DCP16    .900      0.230   0.183   6   0.109 300   0.053 216   0.058 112   0.046  46   0.060 327   0.019 300   0.018 195   0.019  65
DCP17    .965      0.095   0.088   7   0.061 281   0.072 236   0.033 135   0.019  18   0.018 337   0.037  68   0.014  33   0.006 327
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

FILTER HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYZED
0.0	23.02	0.172	0.231	2.53	0.0	19.82	12001.0	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA,NMAX	AERO DAMP	TOD	EXT DAMP
68.2 (223.9)	12099 (252.7)	0.32E 07	-0.162	1.073	19.85	-0.00532	0.024	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	REC 0	REC 1	PHI	REC 2	PHI	REC 3	PHI	REC 4	PHI	REC 5	PHI	REC 6	PHI	REC 7	PHI	REC 8	PHI	REC 9	PHI
ALPHA		19.822	2.533	0	0.053	26	0.056	214	0.021	133	0.032	74	0.008	63	0.013	170	0.002	27	0.012	356
CN		0.900	0.196	74	0.069	119	0.033	126	0.026	91	0.002	236	0.033	85	0.007	125	0.009	351	0.003	225
CM		-0.101	0.067	277	0.005	306	0.007	252	0.006	253	0.001	170	0.032	241	0.032	303	0.006	190	0.001	67
PCP 1	.010	1.407	0.153	133	0.071	208	0.053	315	0.007	356	0.006	6	0.011	169	0.006	336	0.015	302	0.008	260
PCP 2	.020	1.555	0.124	136	0.060	300	0.043	307	0.020	123	0.014	185	0.006	265	0.036	306	0.019	311	0.008	240
PCP 3	.030	1.446	0.123	137	0.088	231	0.035	345	0.002	32	0.006	19	0.010	307	0.015	44	0.013	175	0.014	163
PCP 4	.040	2.004	0.614	148	0.216	91	0.063	169	0.020	119	0.003	97	0.023	99	0.024	87	0.001	306	0.015	343
PCP 5	.076	2.305	0.464	146	0.307	93	0.077	172	0.067	119	0.030	181	0.017	133	0.011	86	0.003	351	0.007	301
PCP 6	.099	1.565	0.272	115	0.320	81	0.050	151	0.019	128	0.017	223	0.035	265	0.011	262	0.002	12	0.006	201
PCP 7	.145	1.500	0.218	68	0.009	30	0.053	156	0.028	110	0.020	176	0.013	96	0.017	91	0.005	150	0.017	14
PCP 8	.200	1.272	0.216	81	0.061	131	0.072	163	0.012	146	0.072	215	0.011	160	0.011	211	0.016	232	0.016	360
PCP 9	.250	1.168	0.260	75	0.088	125	0.060	165	0.020	171	0.016	290	0.017	332	0.019	163	0.023	306	0.003	165
PCP10	.300	1.131	0.232	72	0.078	127	0.066	163	0.015	81	0.010	339	0.036	289	0.035	156	0.023	320	0.035	308
PCP11	.399	1.069	0.262	68	0.076	126	0.053	118	0.003	96	0.007	125	0.036	225	0.007	216	0.011	316	0.039	170
PCP12	.521	0.918	0.268	66	0.066	116	0.052	125	0.063	131	0.006	213	0.009	133	0.014	156	0.001	67	0.010	187
PCP13	.600	0.836	0.267	62	0.056	127	0.030	130	0.023	106	0.036	311	0.036	136	0.013	153	0.013	133	0.010	260
PCP14	.701	0.773	0.233	56	0.027	110	0.038	86	0.035	56	0.006	12	0.016	69	0.013	95	0.022	360	0.036	232
PCP15	.800	0.627	0.202	50	0.008	56	0.035	68	0.031	56	0.002	260	0.013	4	0.013	[illegible]	0.013	6	0.010	154
PCP16	.900	0.278	0.116	43	0.012	187	0.011	56	0.016	67	0.003	235	0.033	88	0.012	121	0.019	8	0.039	290
PCP17	.969	0.091	0.059	50	0.019	136	0.029	36	0.023	117	0.020	30	0.015	90	0.016	98	0.022	8	0.010	27

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

FILTER HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYZED
0.0	22.95	0.111	0.350	2.59	0.0	0.07	12005.1	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA,NMAX	AERO DAMP	TOD	EXT DAMP
105.4 (345.9)	28776 (60	0.50E 07	-0.026	0.331	2.69	-0.00085	0.203	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	REC 0	REC 1	PHI	REC 2	PHI	REC 3	PHI	REC 4	PHI	REC 5	PHI	REC 6	PHI	REC 7	PHI	REC 8	PHI	REC 9	PHI
ALPHA		0.067	2.503	0	0.058	7	0.067	310	0.023	136	0.025	78	0.021	4	0.015	203	0.036	300	0.006	337
CN		0.118	0.213	356	0.002	292	0.032	163	0.031	268	0.000	66	0.032	143	0.033	266	0.003	175	0.032	231
CM		-0.017	0.037	338	0.031	315	0.033	273	0.030	97	0.001	177	0.001	332	0.001	79	0.001	21	0.009	31
PCP 1	.010	-0.810	1.808	347	0.033	8	0.015	156	0.036	103	0.035	100	0.006	17	0.026	265	0.015	159	0.037	277
PCP 2	.020	-0.363	1.171	349	0.031	306	0.039	236	0.035	278	0.003	260	0.013	11	0.031	72	0.015	175	0.003	320
PCP 3	.030	-0.251	1.063	348	0.021	303	0.007	166	0.006	304	0.002	251	0.006	19	0.002	259	0.036	233	0.033	3
PCP 4	.040	0.002	0.766	360	0.017	333	0.035	156	0.034	133	0.033	166	0.036	35	0.031	278	0.038	181	0.035	356
PCP 5	.076	0.217	0.621	353	0.013	302	0.037	166	0.003	108	0.006	175	0.001	70	0.037	108	0.035	158	0.003	308
PCP 6	.099	0.318	0.670	351	0.013	330	0.006	121	0.001	347	0.035	163	0.035	35	0.006	332	0.033	136	0.032	271
PCP 7	.140	[illegible]	0.308	351	0.012	277	0.036	183	0.032	111	0.005	80	0.035	11	0.035	236	0.035	178	0.036	250
PCP 8	.200	0.103	0.318	356	0.003	276	0.039	153	0.003	341	0.005	176	0.026	167	0.001	306	0.036	333	0.006	276
PCP 9	.250	0.165	0.271	353	0.033	71	0.036	56	0.033	171	0.032	233	0.035	183	0.031	3	0.037	116	0.038	175
PCP10	.300	0.178	0.271	356	0.033	300	0.031	82	0.036	260	0.036	197	0.035	166	0.035	358	0.036	75	0.032	260
PCP11	.399	0.176	0.136	350	0.033	330	0.031	263	0.004	253	0.005	60	0.035	186	0.007	260	0.032	136	0.033	282
PCP12	.521	0.117	0.165	1	0.036	133	0.036	02	0.032	136	0.033	290	0.035	153	0.038	328	0.032	331	0.035	177
PCP13	.600	0.150	0.137	6	0.007	123	0.033	108	0.032	105	0.036	302	0.033	175	0.032	137	0.036	348	0.002	127
PCP14	.701	0.103	0.071	10	0.002	167	0.002	71	0.002	287	0.001	222	0.036	155	0.031	267	0.033	113	0.035	208
PCP15	.800	0.086	0.067	15	0.031	171	0.032	107	0.032	330	0.033	343	0.003	137	0.032	263	0.035	176	0.032	233
PCP16	.900	-0.075	0.010	8	0.002	326	0.002	306	0.031	266	0.005	50	0.036	133	0.003	266	0.036	300	0.001	316
PCP17	.965	-0.033	0.013	175	0.033	130	0.036	136	0.033	360	0.030	336	0.036	133	0.037	266	0.033	336	0.033	310

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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            SHAFT HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT   CYCLES ANALYSED
              0.0         22.96      0.113        0.333        2.50       0.0         7.53       12095.2        22

            V            Q            RN          CM(MIN)     CN(MAX)     ALPHA,CNMAX  AERO DAMP   TOP          EXT DAMP
             103.1        27747.     3.49E 07    -0.021       0.568        4.92       -0.00085     0.735        0.0
            (338.2)      (579.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C     REF 0    REF 1 PHI   REF 2 PHI   REF 3 PHI   REF 4 PHI   REF 5 PHI   REF 6 PHI   REF 7 PHI   REF 8 PHI   REF 9 PHI

ALPHA            7.405    2.507   0   0.067   5   0.066 220   .020 133    0.003  76   0.026  38   0.011 176   0.018 206   0.009 263
CN               0.353    0.220 356   0.003  16   0.000 289   0.001  47   0.009 191   0.002 115   0.002 236   0.006 226   0.002 267
CM              -0.012    0.007 308   0.001 286   0.000 230   0.000 203   0.000  67   0.001 200   0.001  16   0.001  68   0.001  86

DCP 1   .010     1.065    1.467 346   0.020  11   0.004 316   0.008  57   0.001 337   0.002  77   0.007 269   0.011 227   0.002 313
DCP 2   .030     0.868    1.168 349   0.019 356   0.006 289   0.003  63   0.001 136   0.006  97   0.007 326   0.012 237   0.006  10
DCP 3   .030     0.949    0.905 349   0.019 337   0.002 261   0.006  63   0.002  76   0.005 116   0.002 303   0.010 218   0.002 130
DCP 4   .049     0.867    0.813 349   0.016 321   0.006 158   0.002  67   0.002 100   0.003 157   0.009 257   0.012 237   0.006 111
DCP 5   .076     0.915    0.668 353   0.008 344   0.006 237   0.001 331   0.002 275   0.003 111   0.008 244   0.008 226   0.006 287
DCP 6   .100     0.877    0.512 353   0.000   5   0.006 286   0.002  50   0.003  15   0.003 147   0.003 267   0.006 267   0.011 210
DCP 7   .145     0.663    0.417 351   0.007 311   0.007 161   0.005 186   0.009 111   0.003 207   0.001 191   0.005 267   0.006 330
DCP 8   .200     0.553    0.335 356   0.005 348   0.012 313   0.007  73   0.002  46   0.002 147   0.006 323   0.013 217   0.006 206
DCP 9   .250     0.459    0.286 353   0.007 358   0.003 181   0.006  29   0.001 335   0.005  86   0.002 102   0.006 175   0.001  97
DCP10   .300     0.447    0.219 356   0.008  57   0.001 338   0.002   1   0.006 236   0.003  46   0.002 127   0.017 219   0.002 225
DCP11   .350     0.378    0.188 344   0.002  21   0.002 356   0.000 165   0.003 282   0.005  86   0.006 237   0.011 227   0.002 226
DCP12   .501     0.265    0.147   3   0.002  61   0.003 123   0.002  56   0.001  67   0.006 141   0.001 207   0.008 256   0.013 276
DCP13   .600     0.268    0.108   7   0.005 127   0.001 288   0.002  22   0.003 172   0.006 109   0.006 227   0.006 226   0.002 221
DCP14   .701     0.226    0.077   7   0.003  51   0.005 136   0.002  67   0.002 336   0.003 113   0.003 183   0.006 198   0.005 286
DCP15   .800     0.130    0.063  13   0.001 166   0.001 283   0.002   6   0.001  33   0.005 116   0.003 228   0.003 197   0.006 277
DCP16   .900    -0.067    0.013  33   0.003  62   0.003  13   0.003 257   0.006  73   0.008  72   0.001  45   0.008 267   0.002 200
DCP17   .949    -0.066    0.016 212   0.003  56   0.006 257   0.007  50   0.008 262   0.005 236   0.001 317   0.006 338   0.003 263


                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            SHAFT HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT   CYCLES ANALYSED
              0.0         22.98      0.116        0.307        2.56       0.0         6.99       12095.3     [illegible]

            V            Q            RN          CM(MIN)     CN(MAX)     ALPHA,CNMAX  AERO DAMP   TOP          EXT DAMP
             100.8        26665.     3.48E 07    -0.017       0.811        7.53       -0.00127     0.836        0.0
            (330.6)      (556.9)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C     REF 0    REF 1 PHI   REF 2 PHI   REF 3 PHI   REF 4 PHI   REF 5 PHI   REF 6 PHI   REF 7 PHI   REF 8 PHI   REF 9 PHI

ALPHA            6.98     2.501   0   0.062  12   0.065 210   0.022 133   0.023  16   0.025  63   0.011 168   0.013 223   0.011 263
CN               0.605    0.224 355   0.037  17   0.001 241   0.001 281   0.022 201   0.003 111   0.006 201   0.007 327   0.001 206
CM              -0.007    0.020 333   0.001 238   0.001  73   0.001 115   0.001 187   0.001 [illegible] 0.001  13   0.001 163   0.007 188

DCP 1   .010   [illegible] 1.676 345  0.021 337   0.016 110   0.007 172   0.005 196   0.007  63   [illegible] 0.013 173   0.006 227
DCP 2   .030     0.167    1.189 352   0.017 320   0.010 167   0.005  96   0.009 235   0.009  63   0.004 330   0.012 181   0.006 206
DCP 3   .030     0.245    1.001 349   0.019  17   0.016 151   0.006 110   0.006 145   0.009  17   0.004 303   0.002 167   0.010 231
DCP 4   .049     1.047    0.810 353   [illegible] 0.015 135   0.005 106   0.006 193   0.005  14   0.006 267   0.006 164   0.001 105
DCP 5   .076     1.441    0.660 359   0.017 345   0.011 145   0.006 197   0.006 236   0.007  46   0.005 261   0.006 267   0.003 330
DCP 6   .100     1.365    0.551 351   0.017 347   0.017  29   0.007 339   0.006 239   0.006 136   0.007  61   0.006 186   0.013 178
DCP 7   .145     1.135    0.676 351   0.005  17   0.007 130   0.005   3   0.005 161   0.005 135   0.006 337   0.006 165   0.003 107
DCP 8   .200     0.032    0.367 355   0.006  17   0.005 161   0.007 169   0.005 256   0.005 176   0.005  16   0.003 163   0.010 176
DCP 9   .250     0.776    0.286 355   0.016  11   0.007 176   0.016 261   0.002 288   0.003  48   0.009 216   0.013 133   0.006  73
DCP10   .300     0.713    0.263 356   0.011 354   0.006 290   0.011  21   0.002 213   0.011  75   0.003 117   0.026 118   0.006 265
DCP11   .350     0.606    0.101   0   0.006  11   0.007 337   0.001 177   0.006 223   0.016 130   0.007 316   0.013 318   0.001 177
DCP12   .501     0.611    0.160   2   0.006  10   0.013 188   0.016 316   0.005  72   0.013  71   0.006 163   0.020 136   0.005  26
DCP13   .600     0.304    0.113   4   0.008  67   0.003 337   0.007 318   0.007  55   0.013 136   0.009 108   0.013 336   0.002 167
DCP14   .701     0.187    0.077  11   0.008   9   0.006 268   0.006 337   0.006 330   0.011  76   0.005 107   0.012 326   0.008 335
DCP15   .800     0.103    0.068  10   0.007   6   0.006 244   0.003 319   0.002 337   0.013 163   0.006 303   0.009 160   0.003 185
DCP16   .900    -0.055    0.018  33   0.006  67   0.016 216   0.000 227   0.002  16   0.008 164   0.002 117   0.013 167   0.017 337
DCP17   .949    -0.068    0.007 146   0.010 116   0.003 311   0.008 133   0.002 [illegible] 0.010 [illegible] 0.007 337 0.013 [illegible] 0.005  81
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                      FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

            TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H      ALPHA.O      TEST POINT   CYCLES ANALYSED
              0.0         22.96        0.117         0.296        2.41        0.0         7.48       12095.4        20

            V            Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDP          EXT DAMP
              99.6         26095.      0.48E 07     -0.316        1.365       10.12      -0.00125     1.336         0.0
             (326.6)      (545.0)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                7.477    2.407   0   0.062   5   0.057 231   0.024 129   0.023  21   0.019 132   0.011 175   0.025 176   0.013 263
CN                   0.853    0.221 356   0.008  38   0.007 358   0.002 267   0.002 178   0.002 157   0.003 316   0.008 312   0.001 263
CM                  -0.002    0.009 299   0.001 270   0.002 196   0.000  96   0.001 350   0.001 337   0.001 137   0.006 358   0.001 131

DCP 1     .012       4.161    1.338 346   0.129  50   0.056 318   0.002 183   0.013 301   0.008 238   0.016  89   0.036 312   0.005  76
DCP 2     .020       3.444    1.206 350   0.031   5   0.016 316   0.033  61   0.037 280   0.010  59   0.015  86   0.069 326   0.007  75
DCP 3     .030       3.178    1.021 349   0.026 326   0.016 335   0.005 120   0.036 339   0.005  35   0.011  65   0.020 314   0.003  96
DCP 4     .049       2.835    0.846 353   0.019 352   0.002 237   0.010 212   0.003 239   0.036 299   0.007  20   0.025 329   0.010 110
DCP 5     .074       2.436    0.675 353   0.014   4   0.031 267   0.036 178   0.022  76   0.000 219   0.006  31   0.018 311   0.036  98
DCP 6     .099       2.156    0.560 351   0.011   3   0.031 287   0.006 168   0.002 306   0.031 252   0.003  43   0.020 319   0.009  66
DCP 7     .145       1.606    0.419 357   0.011   4   0.006 344   0.006 238   0.004 233   0.005  53   0.006  59   0.017 322   0.036  45
DCP 8     .200       1.332    0.331 355   0.012  27   0.006 170   0.003 249   0.006  35   0.007 199   0.038  66   0.022 330   0.009 112
DCP 9     .250       1.089    0.283 356   0.009  61   0.009  13   0.005 239   0.036 165   0.005 162   0.002 287   0.011 179   0.003 227
DCP10     .300       0.986    0.236 356   0.007  57   0.005  37   0.002 263   0.002 196   0.003 265   0.007 276   0.012 196   0.036 223
DCP11     .399       0.819    0.189   3   0.036  23   0.011   7   0.002 277   0.003 119   0.031 136   0.036 307   0.018 191   0.035 254
DCP12     .501       0.597    0.163   4   0.007  56   0.009 342   0.003 321   0.005 177   0.036  87   0.002 307   0.012 195   0.036 276
DCP13     .600       0.509    0.139  11   0.009  49   0.010 349   0.003 346   0.007 169   0.003 189   0.039 336   0.010 180   0.033 263
DCP14     .701       0.442    0.073  18   0.007  58   0.009 358   0.006 277   0.002 307   0.035 175   0.036 286   0.010 181   0.001 256
DCP15     .800       0.229    0.044  29   0.008  96   0.006   6   0.007 262   0.006 168   0.001 131   0.006 318   0.015 173   0.003 269
DCP16     .900      -0.063    0.026  29   0.003 332   0.009  58   0.002 119   0.036 196   0.038 163   0.036 267   0.018 172   0.003 328
DCP17     .969      -0.063    0.036  94   0.007  97   0.008 350   0.006 131   0.006 239   0.035 329   0.007 279   0.019 215   0.003 349


                      FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

            TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H      ALPHA.O      TEST POINT   CYCLES ANALYSED
              0.0         22.99        0.118         0.293        2.60        0.0         9.96       12095.5        20

            V            Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDP          EXT DAMP
              99.3         26037.      0.48E 07     -0.308        1.270       12.64      -0.00133     1.068         0.0
             (325.9)      (543.8)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                9.919    2.606   0   0.068  16   0.063 220   0.022 110   0.027  12   0.011  70   0.016 169   0.013 102   0.006 344
CN                   1.060    0.195   2   0.018   5   0.006 257   0.001 227   0.001 356   0.002 147   0.001  66   0.007  74   0.001 131
CM                   0.005    0.011 307   0.003 213   0.001 198   0.001 139   0.000 144   0.001   7   0.000  62   0.003 272   0.001 326

DCP 1     .010       9.655    1.422 351   0.287 269   0.169 161   0.027 165   0.028 135   0.012 111   0.012 357   0.013 357   0.036 195
DCP 2     .020       6.596    0.986 352   0.070  44   0.020 338   0.005 238   0.001  71   0.032 313   0.006  83   0.016 332   0.003 162
DCP 3     .030       4.103    0.965 353   0.041   3   0.007 266   0.003 151   0.001 171   0.036  67   0.003 149   0.038 122   0.003 210
DCP 4     .049       3.662    0.757 356   0.049  20   0.007 280   0.002  72   0.003 330   0.037  65   0.005 321   0.032 266   0.003  94
DCP 5     .074       3.071    0.605 356   0.035  17   0.038 285   0.002 151   0.002  26   0.008  70   0.005  57   0.035  76   0.036 350
DCP 6     .099       2.607    0.497 356   0.031  19   0.013 273   0.004 181   0.005 144   0.036  68   0.036 333   0.006 160   0.032 305
DCP 7     .145       2.315    0.377 357   0.038 355   0.011 271   0.001 225   0.036 207   0.033 188   0.007  92   0.007 325   0.035  15
DCP 8     .200       1.633    0.337   1   0.019 349   0.038 301   0.003 190   0.005 268   0.007 107   0.001  97   0.007 330   0.003 333
DCP 9     .252       1.373    0.265   1   0.010   3   0.017 282   0.006 198   0.001 305   0.002 223   0.036  76   0.011  67   0.036 211
DCP10     .300       1.216    0.200   1   0.021  12   0.036 335   0.001  99   0.005  58   0.002 332   0.003 167   0.012  56   0.036   4
DCP11     .399       0.968    0.164   8   0.019  19   0.008 267   0.002 330   0.006  77   0.003 139   0.001 190   0.012  80   0.031 108
DCP12     .501       0.736    0.126  15   0.023  17   0.035 269   0.032 101   0.002 229   0.036 162   0.005  66   0.007  86   0.036 188
DCP13     .600       0.636    0.086  26   0.019   8   0.031 259   0.002 103   0.002   3   0.033 192   0.003 313   0.010  82   0.036 126
DCP14     .701       0.498    0.051  37   0.015  36   0.036 266   0.005 281   0.006   2   0.032 168   0.031 133   0.030  80   0.036 117
DCP15     .800       0.264    0.036  61   0.008  17   0.038 275   0.006 278   0.005  36   0.033 247   0.003 330   0.011  96   0.033  78
DCP16     .900      -0.025    0.027  68   0.013  16   0.001 291   0.002  70   0.008 251   0.006 185   0.007 339   0.011  91   0.036 157
DCP17     .965      -0.060    0.013  16   0.002  36   0.035 277   0.036   7   0.006 171   0.036  36   0.038  66   0.013  88   0.035 252
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                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          [illegible]      DRIVE HZ      K          MACH NO     DEL.ALPHA   DEL.H    ALPHA.0    TEST POINT   CYCLES ANALYSED
          [illegible]      22.9[illegible]   0.111   [illegible]  [illegible]  [illegible]  12.3[illegible]  [illegible]  [illegible]

          V                Q             RN          CM(MIN)     CN(MAX)     ALPHA,CNMAX   AERO DAMP   [illegible]   [illegible]
             104.8           28412.      [illegible] -0.1[illegible]  1.[illegible]  14.76   [illegible]  [illegible]  [illegible]
            (343.9)         (593.4)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C     HRS 0     HRS 1 PHI   HRS 2 PHI   HRS 3 PHI   HRS 4 PHI   HRS 5 PHI   HRS 6 PHI   HRS 7 PHI   HRS 8 PHI   HRS 9 PHI

ALPHA             [illegible]
CN                [illegible]
CM                [illegible]

REP 1    [illegible]
REP 2    [illegible]
REP 3    [illegible]
REP 4    [illegible]
REP 5    [illegible]
REP 6    [illegible]
REP 7    [illegible]
REP 8    [illegible]
REP 9    [illegible]
REP10    [illegible]
REP11    [illegible]
REP12    [illegible]
REP13    [illegible]
REP14    [illegible]
REP15    [illegible]
REP16    [illegible]
REP17    [illegible]

                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          [illegible]      DRIVE HZ      K          MACH NO     DEL.ALPHA   DEL.H    ALPHA.0    TEST POINT   CYCLES ANALYSED
          [illegible]      [illegible]   0.11[illegible]  [illegible]  [illegible]  [illegible]  14.[illegible]  [illegible]  [illegible]

          V                Q             RN          CM(MIN)     CN(MAX)     ALPHA,CNMAX   AERO DAMP   [illegible]   [illegible]
             101.7           27100.      [illegible] -0.1[illegible]  1.[illegible]  15.90   [illegible]  [illegible]  [illegible]
            (333.5)         (566.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C     HRS 0     HRS 1 PHI   HRS 2 PHI   HRS 3 PHI   HRS 4 PHI   HRS 5 PHI   HRS 6 PHI   HRS 7 PHI   HRS 8 PHI   HRS 9 PHI

ALPHA             [illegible]
CN                [illegible]
CM                [illegible]

REP 1    [illegible]
REP 2    [illegible]
REP 3    [illegible]
REP 4    [illegible]
REP 5    [illegible]
REP 6    [illegible]
REP 7    [illegible]
REP 8    [illegible]
REP 9    [illegible]
REP10    [illegible]
REP11    [illegible]
REP12    [illegible]
REP13    [illegible]
REP14    [illegible]
REP15    [illegible]
REP16    [illegible]
REP17    [illegible]
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

      TUNED HZ      DRIVE HZ     K           MACH NO      DEL_ALPHA    DEL_H       ALPHA_0       TEST POINT   CYCLES ANALYSED
        0.0          22.98       0.117        0.296         7.51         0.0         17.90        12907.1        20

      V             Q            RN           CM(MIN)      CN(MAX)      ALPHA_NMAX  AERO DAMP     TAU          EXT DAMP
                                 3.46E 07     -0.162       1.786        17.69       -0.3395       6.035          0.0
       99.8          26267.
      (327.6)       (548.6)
                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA            17.991    [illegible]
CN                1.909    [illegible]
CM               -0.086    [illegible]

DCP 1    [illegible]
DCP 2    [illegible]
DCP 3    [illegible]
DCP 4    [illegible]
DCP 5    [illegible]
DCP 6    [illegible]
DCP 7    [illegible]
DCP 8    [illegible]
DCP 9    [illegible]
DCP10    [illegible]
DCP11    [illegible]
DCP12    [illegible]
DCP13    [illegible]
DCP14    [illegible]
DCP15    [illegible]
DCP16    [illegible]
DCP17    [illegible]


                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

      TUNED HZ      DRIVE HZ     K           MACH NO      DEL_ALPHA    DEL_H       ALPHA_0       TEST POINT   CYCLES ANALYSED
        0.0          22.96       0.118        0.292         7.56         0.0         18.00        12907.6        20

      V             Q            RN           CM(MIN)      CN(MAX)      ALPHA_NMAX  AERO DAMP     TAU          EXT DAMP
                                 3.40E 07     -0.167       1.790        17.85       -0.2995       6.750          0.0
       99.1          25937.
      (325.1)       (541.7)
                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA            18.003    [illegible]
CN                1.771    [illegible]
CM               -0.110    [illegible]

DCP 1    [illegible]
DCP 2    [illegible]
DCP 3    [illegible]
DCP 4    [illegible]
DCP 5    [illegible]
DCP 6    [illegible]
DCP 7    [illegible]
DCP 8    [illegible]
DCP 9    [illegible]
DCP10    [illegible]
DCP11    [illegible]
DCP12    [illegible]
DCP13    [illegible]
DCP14    [illegible]
DCP15    [illegible]
DCP16    [illegible]
DCP17    [illegible]
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
           0.0         45.45       0.216       0.314       2.82        0.0         0.10       12099.1      20

          V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
           107.2       29978.      0.51E 07   -0.026       0.286       3.00       -0.00082     0.725       0.0
          (351.6)     (626.1)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.102   2.821   0   0.079 358   0.091 262   0.006 127   0.029  85   0.024  51   0.015 186   0.011 170   0.011 356
CN                0.102   0.190   2   0.003   9   0.005   8   0.005 327   0.002 197   0.002  41   0.002 211   0.005 148   0.003 255
CM               -0.013   0.013 293   0.001 288   0.001 254   0.002 159   0.000 110   0.001 295   0.001 102   0.001 337   0.001  86

DCP 1    .010    -0.489   1.350 344   0.042 353   0.012 187   0.007 330   0.026 164   0.021 349   0.008 362   0.014  74   0.005 176
DCP 2    .020    -0.281   1.020 350   0.023 292   0.020 319   0.004 328   0.005 203   0.005 339   0.011 140   0.010 130   0.003  34
DCP 3    .030    -0.069   0.857 349   0.021 301   0.014 309   0.006 177   0.008 217   0.004   3   0.010 164   0.004  71   0.005  28
DCP 4    .049     0.145   0.697 350   0.013 336   0.016 340   0.010 190   0.007 176   0.002 210   0.007 178   0.001 148   0.008   6
DCP 5    .074     0.244   0.562 351   0.010 350   0.009 321   0.007 177   0.009 141   0.001 285   0.002  93   0.002  40   0.005  23
DCP 6    .099     0.319   0.484 352   0.009   1   0.010 336   0.006 197   0.006 149   0.002 227   0.005 149   0.004  91   0.003 120
DCP 7    .149     0.228   0.360 355   0.006 344   0.008 337   0.003 181   0.002 266   0.004  72   0.006 189   0.006 132   0.003 233
DCP 8    .200     0.167   0.286   3   0.008 347   0.004  85   0.006   7   0.011 178   0.005 294   0.003 214   0.007 124   0.004 166
DCP 9    .250     0.143   0.250   2   0.002 178   0.008 346   0.008 304   0.005  72   0.007  37   0.004 150   0.002 117   0.002 168
DCP10    .300     0.153   0.210   2   0.004 352   0.010 351   0.003 340   0.002 207   0.009   6   0.003 174   0.007 138   0.006 201
DCP11    .399     0.137   0.170  12   0.006  77   0.012  13   0.009 317   0.005 247   0.004  18   0.004 208   0.006 192   0.004 244
DCP12    .501     0.098   0.131  19   0.002  20   0.005  64   0.005 326   0.009 172   0.001 317   0.001 303   0.007 176   0.006 298
DCP13    .600     0.100   0.104  27   0.003 182   0.004 326   0.007 308   0.004 254   0.007  66   0.002 249   0.004 146   0.005 233
DCP14    .701     0.183   0.069  34   0.001 182   0.006  39   0.005  16   0.003 331   0.007 193   0.000  62   0.009 157   0.004 295
DCP15    .800     0.075   0.046  46   0.007  26   0.003  89   0.008 352   0.003 263   0.003 104   0.004 281   0.004 173   0.003 212
DCP16    .900    -0.075   0.024  74   0.004 124   0.005 132   0.008 286   0.002  87   0.004 164   0.003 241   0.007 147   0.007 243
DCP17    .969    -0.034   0.012 159   0.001 109   0.001   5   0.021 358   0.004 333   0.007  35   0.006 293   0.006  87   0.009 322
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
           0.0         45.46       0.222       0.306       2.75        0.0         2.49       12099.2      20

          V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
           104.1       28561.      0.50E 07   -0.022       0.515       5.14       -0.00088     0.758       0.0
          (341.7)     (596.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             2.488   2.754   0   0.070  28   0.095 240   0.017 305   0.031  26   0.023  44   0.022 175   0.017 263   0.015 338
CN                0.328   0.191   1   0.002  92   0.003 342   0.009 336   0.001 274   0.003   4   0.002 192   0.004 350   0.001 278
CM               -0.008   0.013 292   0.001  33   0.001 193   0.003 161   0.001  98   0.001 143   0.000  53   0.002 193   0.000  15

DCP 1    .010     0.999   1.302 341   0.032  34   0.023  38   0.013 347   0.012  68   0.019 336   0.004  47   0.003  38   0.005  69
DCP 2    .020     0.868   1.042 348   0.019  17   0.010 269   0.008 308   0.004 161   0.006  42   0.013  91   0.008 253   0.005 349
DCP 3    .030     0.912   0.886 348   0.013  17   0.007 265   0.005 340   0.001 141   0.003  38   0.006  99   0.006 233   0.002 234
DCP 4    .049     0.961   0.717 349   0.009  61   0.008 270   0.004 323   0.003 148   0.010 123   0.005 135   0.005 321   0.006 357
DCP 5    .074     0.906   0.575 350   0.009  38   0.005 221   0.001 243   0.001 262   0.004  83   0.004  68   0.003  53   0.002   4
DCP 6    .099     0.882   0.474 352   0.014  51   0.008 297   0.008 253   0.004 156   0.001  36   0.006  60   0.004 302   0.003  81
DCP 7    .149     0.647   0.357 355   0.007  55   0.004  91   0.007 268   0.002  91   0.004  21   0.006  97   0.006 176   0.004 307
DCP 8    .200     0.515   0.296   1   0.010  84   0.004 214   0.005 284   0.006  48   0.001  95   0.008  92   0.006 309   0.005 110
DCP 9    .250     0.430   0.249   0   0.003 133   0.007   6   0.016 330   0.002 253   0.007   1   0.011 180   0.005 238   0.005 297
DCP10    .300     0.410   0.227   3   0.005 230   0.005 241   0.010 344   0.005 129   0.002 307   0.006 213   0.008 302   0.004 326
DCP11    .399     0.331   0.165  14   0.001  93   0.009  16   0.015 350   0.010 286   0.005  66   0.013 235   0.009   2   0.004 208
DCP12    .501     0.244   0.131  18   0.007  80   0.010 286   0.015 348   0.002  44   0.007  43   0.007 263   0.005 323   0.001 217
DCP13    .600     0.209   0.106  23   0.010  90   0.001 198   0.011 358   0.004 226   0.002 327   0.001 193   0.001 285   0.003 174
DCP14    .701     0.269   0.077  40   0.006 218   0.004   9   0.008 351   0.003 251   0.007  18   0.003 108   0.005  13   0.001 286
DCP15    .800     0.115   0.047  49   0.005 217   0.008  48   0.009 315   0.002  57   0.006 312   0.001 251   0.011  25   0.005  16
DCP16    .900    -0.067   0.018  62   0.005 244   0.006 310   0.015 333   0.005 233   0.009 248   0.003 232   0.009  26   0.001 240
DCP17    .969     0.053   0.012 164   0.011 240   0.011  34   0.001 228   0.007 347   0.007 359   0.005  76   0.010 356   0.006 165
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                                 FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                   0.0         45.43       0.226         0.301       2.77        0.0          4.98      12099.3      20

                  V           Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   102.4       27689.      0.49E 07     -0.019       0.754        7.62      -0.00098     0.829       0.0
                  (335.9)     (578.3)                                HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RE: 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             4.975     2.774   0   0.070   6   0.072 256   0.011 150   0.037  47   0.013  46   0.018 175   0.010 252   0.014 350
CN                0.569     0.192   3   0.005  29   0.004   5   0.012 268   0.002 134   0.001 314   0.004 208   0.004 307   0.000 128
CM               -0.003     0.014 291   0.000  67   0.002 206   0.003 100   0.001 327   0.001  79   0.001  37   0.001 133   0.001 190

DCP 1     .010    2.588     1.301 343   0.026  44   0.022 206   0.023 229   0.011   8   0.014  35   0.006 120   0.019 230   0.001 130
DCP 2     .020    2.106     1.026 349   0.027  24   0.009 235   0.025 259   0.005 278   0.007  22   0.008 150   0.007 249   0.007 185
DCP 3     .030    1.964     0.875 348   0.024  20   0.003 259   0.018 258   0.002 109   0.010  34   0.005 169   0.004 252   0.002 273
DCP 4     .049    1.847     0.731 350   0.014  32   0.005 339   0.019 234   0.008 178   0.002  99   0.005 120   0.001 312   0.008 157
DCP 5     .074    1.622     0.585 350   0.014  35   0.008 277   0.015 252   0.004 242   0.003 197   0.005 121   0.007 305   0.003 234
DCP 6     .099    1.470     0.471 353   0.013  52   0.001 233   0.013 224   0.002 244   0.003  80   0.003  96   0.008 333   0.001 193
DCP 7     .149    1.091     0.378 355   0.019  20   0.005 299   0.013 246   0.003 104   0.007 295   0.004 222   0.007 293   0.006 230
DCP 8     .200    0.884     0.289   2   0.005 343   0.005 330   0.013 265   0.005 202   0.003  53   0.001 139   0.008 309   0.000 294
DCP 9     .250    0.727     0.254   2   0.008  12   0.002 314   0.013 276   0.007 112   0.006 167   0.008 200   0.012 331   0.002  98
DCP10     .300    0.666     0.214   4   0.004  33   0.005 326   0.009 258   0.003  71   0.007 332   0.005 224   0.001 279   0.003 137
DCP11     .399    0.541     0.171  16   0.007  67   0.006  14   0.017 277   0.006  36   0.005 358   0.002 268   0.001 214   0.001 354
DCP12     .501    0.398     0.135  23   0.007  26   0.007  10   0.011 268   0.006 126   0.003 292   0.003 219   0.001 236   0.004 162
DCP13     .600    0.325     0.108  29   0.008  44   0.009  21   0.011 286   0.006 189   0.003 335   0.009 218   0.010 325   0.001   2
DCP14     .701    0.347     0.073  37   0.003 102   0.008  56   0.011 322   0.004 126   0.006 213   0.005 250   0.004 275   0.001  26
DCP15     .800    0.166     0.054  54   0.003  23   0.007  61   0.012 262   0.002 341   0.001 129   0.006 159   0.002 321   0.004 139
DCP16     .900   -0.051     0.025  89   0.011 250   0.009 334   0.012 244   0.004 190   0.003 269   0.006 235   0.009 301   0.012   1
DCP17     .969   -0.053     0.008 131   0.000 217   0.000 266   0.019 279   0.003 129   0.003 282   0.003 163   0.003  21   0.004 255
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                                 FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                   0.0         45.46       0.228         0.299       2.81        0.0          7.48      12099.4      20

                  V           Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   101.3       27210.      0.49E 07     -0.018       0.999       10.41      -0.00107     0.900       0.0
                  (332.4)     (568.3)                                HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             7.463     2.809   0   0.084 358   0.064 260   0.039 140   0.035  56   0.013  42   0.017 197   0.013  45   0.009  44
CN                0.806     0.192   5   0.009  42   0.003  20   0.007 205   0.002  26   0.001 273   0.002 124   0.008  83   0.002 131
CM                0.002     0.016 288   0.001 271   0.001 291   0.002  24   0.000 260   0.000  65   0.001 334   0.003 271   0.001 355

DCP 1     .010    4.004     1.196 344   0.126  41   0.082 305   0.028 216   0.016 306   0.013 358   0.008 107   0.016 282   0.002 301
DCP 2     .020    3.363     1.054 349   0.021  24   0.020 314   0.003 102   0.001 334   0.006 339   0.011 139   0.011 265   0.003 206
DCP 3     .030    3.022     0.898 349   0.023   0   0.014 335   0.008  36   0.005  11   0.003 340   0.005  78   0.003 238   0.004 334
DCP 4     .049    2.745     0.742 350   0.023  38   0.011 343   0.005 270   0.006  24   0.005 287   0.007 136   0.006  15   0.004  68
DCP 5     .074    2.345     0.584 351   0.017  26   0.004 356   0.004 302   0.004  38   0.001 358   0.010  97   0.005 352   0.005  85
DCP 6     .099    2.056     0.482 353   0.012  36   0.002 339   0.001 166   0.004 351   0.002  10   0.002 160   0.002 347   0.004 105
DCP 7     .149    1.549     0.360 355   0.016   5   0.005 343   0.004 224   0.010 342   0.002 217   0.006  94   0.002  11   0.006  23
DCP 8     .200    1.235     0.287   1   0.012  13   0.005 332   0.010 222   0.001 126   0.008 190   0.010 167   0.004 124   0.010 145
DCP 9     .250    1.030     0.254   4   0.009  30   0.005 338   0.010 185   0.001  87   0.001  88   0.005  98   0.013  78   0.012  54
DCP10     .300    0.925     0.216   7   0.008  44   0.007  11   0.006 143   0.002  46   0.003  31   0.005 349   0.009  40   0.001 154
DCP11     .399    0.747     0.177  19   0.009  56   0.007  65   0.005 198   0.007  91   0.004 235   0.001 322   0.013  84   0.003 283
DCP12     .501    0.555     0.131  24   0.004  67   0.003  70   0.012 221   0.005  13   0.009 330   0.004  35   [illegible]  99   0.003 207
DCP13     .600    0.431     0.112  35   0.009  65   0.007  35   0.014 204   0.003  23   0.009  92   0.001  43   0.017  78   0.005 169
DCP14     .701    0.427     0.079  48   0.006  69   0.008  63   0.006 211   0.005 162   0.004 223   0.003 185   0.012  95   0.000 288
DCP15     .800    0.205     0.058  57   0.004 132   0.007 168   0.009 211   0.006 255   0.004 346   0.007 151   0.010 108   0.005  56
DCP16     .900   -0.0[illegible]     0.029  65   0.009  50   0.004 114   0.005 202   0.008  61   0.011 232   0.009 155   0.007  38   0.009 183
DCP17     .969   -0.057     0.007 135   0.003  22   0.006 259   0.010 189   0.007 273   0.001 110   0.004 344   0.012 114   0.002 341
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                           FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0          45.50       0.230        0.297        2.76         0.0           9.93       12099.5       20

             V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              100.9         27019.      0.49E 07    -0.011        1.195        12.43       -0.00116      0.976        0.0
             (331.0)       (564.3)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               9.927   2.757   0    0.065  16    0.071 249    0.012 292    0.033  41    0.020  47    0.019 158    0.007 279    0.013 336
CN                  1.013   0.105  10    0.008 344    0.002  29    0.014 305    0.002 236    0.004 324    0.003  85    0.001 351    0.002 239
CM                  0.010   0.017 289    0.001 188    0.001 245    0.005 143    0.001  93    0.001 128    0.001 232    0.001 197    0.001  28

DCP 1     .010      5.493   1.284 349    0.257 260    0.110 144    0.044 196    0.008  48    0.017 139    0.010 295    0.028 166    0.009 207
DCP 2     .020      4.464   0.929 352    0.056  49    0.023 329    0.022 237    0.006 207    0.008 245    0.008 163    0.012 210    0.003 227
DCP 3     .030      3.996   0.874 351    0.033   6    0.010 309    0.010 228    0.008 120    0.001 150    0.007 117    0.005 174    0.002 272
DCP 4     .049      3.553   0.701 352    0.040  18    0.011 287    0.010 213    0.008 140    0.004  40    0.009 159    0.003 252    0.010 133
DCP 5     .074      2.985   0.558 353    0.026   9    0.007 277    0.010 222    0.007 209    0.000 320    0.004 232    0.004 236    0.001  54
DCP 6     .099      2.580   0.456 356    0.021 359    0.001  41    0.014 224    0.008 165    0.001 110    0.006 177    0.007 264    0.004 281
DCP 7     .149      1.944   0.352 359    0.010   6    0.006 292    0.007 223    0.006  34    0.001  83    0.010 192    0.005 358    0.005  64
DCP 8     .200      1.564   0.280   7    0.013 343    0.002 229    0.009 260    0.012 179    0.005  25    0.002 156    0.014 224    0.002 245
DCP 9     .250      1.303   0.250   6    0.007 316    0.009 338    0.014 282    0.001 134    0.004 288    0.003 186    0.007   5    0.009 294
DCP10     .300      1.145   0.203  11    0.007   9    0.004 314    0.015 291    0.003 240    0.008 323    0.006 121    0.006 329    0.008 289
DCP11     .399      0.915   0.164  24    0.008  22    0.009 343    0.025 331    0.006 300    0.013 334    0.011  73    0.003  82    0.006 284
DCP12     .501      0.689   0.134  31    0.004  86    0.007  20    0.016 296    0.003 313    0.005  43    0.006  17    0.005 117    0.001 209
DCP13     .600      0.516   0.100  46    0.007 317    0.011  38    0.014 316    0.005 216    0.003 339    0.003  72    0.001 150    0.002 195
DCP14     .701      0.471   0.087  57    0.008 347    0.005  86    0.018 331    0.004 251    0.011 310    0.003 292    0.003   2    0.008 231
DCP15     .800      0.235   0.062  71    0.008  15    0.010 107    0.021 321    0.002 321    0.004 275    0.005   9    0.004 350    0.003 176
DCP16     .900     -0.021   0.035  53    0.007 297    0.007 181    0.024 311    0.003 315    0.005 296    0.011  66    0.010  16    0.006 132
DCP17     .969     -0.068   0.018  72    0.001 347    0.007 321    0.016 324    0.005 189    0.006 282    0.007 344    0.003 327    0.007 241
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                           FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0          45.49       0.229        0.298        2.77         0.0          12.42       12099.6       20

             V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              101.0         27119.      0.49E 07    -0.089        1.392        14.86        0.00103     -0.863        0.0
             (331.4)       (566.4)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              12.425   2.768   0    0.112 349    0.077 236    0.026 147    0.033  58    0.021  44    0.011 198    0.006  96    0.006 348
CN                  1.064   0.325  28    0.049 211    0.038  76    0.032 303    0.017 217    0.012 134    0.007  25    0.004  56    0.007 297
CM                 -0.005   0.032 152    0.031 341    0.014 230    0.009  95    0.002  11    0.002 287    0.003 162    0.001 231    0.002  93

DCP 1     .010      5.134   1.306  66    0.823   2    0.383 302    0.114 213    0.054  63    0.060  15    0.078 297    0.055 221    0.024 147
DCP 2     .020      4.095   1.166  89    0.883  24    0.468 295    0.247 222    0.124 195    0.136 146    0.108  62    0.038 325    0.027 230
DCP 3     .030      3.522   1.209  90    0.763  13    0.235 291    0.168 271    0.189 207    0.136 146    0.088  96    0.080  54    0.075 351
DCP 4     .049      3.690   0.783  36    0.183 342    0.068 222    0.044 137    0.016  27    0.012 237    0.019 140    0.010  73    0.018 294
DCP 5     .074      3.049   0.649  42    0.160 338    0.056 198    0.023 108    0.013 335    0.011 203    0.005 107    0.007 150    0.009 310
DCP 6     .099      2.621   0.609  44    0.155 319    0.061 169    0.015  55    0.010 285    0.015 154    0.009  34    0.014 250    0.008 255
DCP 7     .149      1.968   0.564  43    0.169 297    0.075 154    0.024 358    0.006 133    0.004 270    0.003 299    0.003 184    0.005  37
DCP 8     .200      1.644   0.557  33    0.177 262    0.077 117    0.014 312    0.005 189    0.012  54    0.015 341    0.027 200    0.007  28
DCP 9     .250      1.429   0.577  21    0.231 233    0.114 104    0.054  12    0.039 286    0.033 146    0.003 111    0.004  26    0.009  82
DCP10     .300      1.299   0.550  12    0.243 221    0.122 112    0.079   8    0.043 243    0.006  60    0.014 202    0.017  76    0.005 304
DCP11     .399      1.047   0.448  14    0.205 211    0.113 102    0.088 354    0.042 239    0.014 190    0.014 126    0.020  65    0.014 298
DCP12     .501      0.769   0.322  11    0.152 184    0.088  75    0.084 317    0.040 208    0.017 165    0.018  78    0.019 345    0.007 302
DCP13     .600      0.544   0.215  14    0.137 152    0.076  45    0.076 288    0.039 171    0.015 117    0.019  23    0.015 261    0.006 292
DCP14     .701      0.475   0.161  20    0.119 139    0.062  21    0.062 248    0.004 118    0.017 115    0.022  16    0.005  91    0.014 289
DCP15     .800      0.281   0.118 353    0.090 131    0.037  18    0.035 231    0.005 294    0.020 149    0.022 339    0.006 101    0.014 263
DCP16     .900      0.038   0.071 316    0.043 140    0.033  22    0.025 218    0.001 321    0.020  57    0.019 287    0.016  56    0.004 240
DCP17     .969     -0.026   0.036 294    0.015 101    0.025 353    0.017 216    0.013  95    0.013 315    0.007 308    0.006 197    0.002 324
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	45.46	0.229	0.298	2.68	0.0	14.90	12099.7	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
100.9 (330.9)	27095. (565.9)	0.49E 07	-0.205	1.719	17.53	0.00075	-0.626	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.904	2.683	0	0.158	34	0.155	295	0.060	81	0.043	86	0.018	20	0.007	271	0.018	239	0.008	97
CN		1.099	0.422	55	0.139	329	0.071	221	0.024	148	0.031	93	0.012	14	0.010	44	0.007	20	0.001	71
CM		-0.029	0.084	177	0.043	80	0.024	353	0.014	303	0.014	243	0.007	155	0.034	160	0.002	59	0.002	301
DCP 1	.010	4.480	1.809	130	0.985	78	0.265	61	0.162	21	0.073	331	0.032	300	0.033	281	0.066	223	0.042	181
DCP 2	.020	3.929	1.680	134	0.875	71	0.138	53	0.247	60	0.180	13	0.056	345	0.061	356	0.041	282	0.002	117
DCP 3	.030	3.362	1.544	132	0.573	68	0.176	111	0.204	56	0.102	44	0.105	34	0.078	2	0.052	11	0.065	345
DCP 4	.049	3.486	0.969	107	0.490	46	0.161	340	0.081	316	0.051	312	0.052	231	0.022	149	0.010	167	0.011	219
DCP 5	.074	2.929	0.876	97	0.367	22	0.083	294	0.046	326	0.037	293	0.034	211	0.023	133	0.008	148	0.008	119
DCP 6	.099	2.549	0.821	90	0.327	6	0.067	285	0.048	312	0.021	289	0.033	224	0.032	155	0.009	174	0.020	175
DCP 7	.149	2.027	0.765	72	0.292	349	0.106	291	0.084	279	0.055	219	0.048	172	0.042	132	0.028	94	0.014	84
DCP 8	.200	1.694	0.713	65	0.261	351	0.136	292	0.061	261	0.033	225	0.023	164	0.017	128	0.017	121	0.016	53
DCP 9	.250	1.466	0.712	53	0.288	336	0.198	270	0.090	193	0.037	174	0.041	136	0.024	94	0.032	78	0.033	1
DCP10	.300	1.322	0.691	47	0.295	332	0.196	256	0.068	203	0.063	170	0.036	95	0.005	33	0.032	58	0.026	321
DCP11	.399	1.095	0.612	43	0.259	327	0.185	245	0.052	216	0.088	164	0.043	78	0.019	313	0.054	54	0.017	291
DCP12	.501	0.847	0.517	33	0.215	304	0.159	211	0.064	170	0.105	127	0.064	43	0.021	78	0.068	2	0.019	253
DCP13	.600	0.633	0.434	25	0.187	280	0.157	185	0.075	148	0.112	95	0.062	13	0.040	24	0.065	308	0.030	204
DCP14	.701	0.557	0.350	15	0.154	253	0.125	158	0.069	107	0.099	50	0.050	323	0.036	343	0.046	237	0.020	96
DCP15	.800	0.364	0.282	359	0.134	245	0.090	147	0.072	97	0.079	27	0.038	294	0.022	312	0.032	187	0.018	89
DCP16	.900	0.117	0.171	352	0.107	249	0.066	130	0.050	90	0.056	2	0.035	267	0.020	264	0.035	146	0.015	95
DCP17	.969	0.016	0.064	351	0.052	270	0.030	135	0.023	82	0.027	29	0.013	304	0.014	293	0.010	160	0.007	84

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	45.54	0.230	0.298	2.67	0.0	17.38	12099.8	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
101.0 (331.4)	27229. (568.7)	0.49E 07	-0.223	1.662	19.09	-0.00168	1.407	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		17.381	2.666	0	0.062	76	0.081	63	0.051	156	0.020	313	0.010	76	0.005	70	0.016	94	0.004	265
CN		1.075	0.404	70	0.111	16	0.065	338	0.031	260	0.008	226	0.004	71	0.001	263	0.006	94	0.004	309
CM		-0.065	0.082	197	0.038	146	0.022	112	0.013	44	0.007	12	0.002	296	0.001	288	0.004	207	0.001	251
DCP 1	.010	3.800	1.657	154	0.612	147	0.276	165	0.116	183	0.098	196	0.051	172	0.078	188	0.027	148	0.016	157
DCP 2	.020	3.351	1.547	150	0.305	140	0.265	173	0.097	151	0.114	203	0.063	160	0.050	224	0.037	186	0.018	259
DCP 3	.030	2.880	1.380	135	0.261	171	0.173	147	0.076	172	0.048	183	0.045	218	0.035	205	0.022	235	0.014	346
DCP 4	.049	3.002	1.017	130	0.290	106	0.088	86	0.052	105	0.063	94	0.049	73	0.026	65	0.029	37	0.035	6
DCP 5	.074	2.474	0.863	114	0.176	93	0.082	49	0.015	229	0.032	62	0.024	76	0.005	79	0.014	353	0.019	341
DCP 6	.099	2.144	0.790	101	0.158	81	0.098	38	0.013	263	0.028	29	0.028	67	0.009	350	0.007	308	0.006	265
DCP 7	.149	1.782	0.682	81	0.188	63	0.132	22	0.034	347	0.032	29	0.033	57	0.013	42	0.023	26	0.018	338
DCP 8	.200	1.546	0.625	78	0.229	66	0.128	25	0.068	15	0.031	28	0.026	50	0.018	14	0.014	21	0.018	315
DCP 9	.250	1.387	0.611	70	0.231	43	0.134	6	0.073	350	0.032	342	0.031	2	0.015	308	0.013	310	0.031	240
DCP10	.300	1.296	0.592	65	0.230	32	0.141	4	0.075	336	0.032	346	0.020	315	0.009	296	0.017	342	0.012	283
DCP11	.399	1.162	0.587	60	0.231	16	0.151	2	0.075	323	0.052	329	0.051	305	0.014	303	0.019	310	0.021	282
DCP12	.501	0.959	0.506	49	0.209	358	0.125	336	0.087	280	0.045	200	0.033	262	0.016	271	0.027	208	0.009	236
DCP13	.600	0.741	0.429	40	0.180	339	0.119	310	0.092	247	0.034	226	0.044	174	0.020	176	0.033	165	0.017	150
DCP14	.701	0.654	0.366	29	0.160	325	0.108	283	0.084	223	0.059	192	0.033	137	0.011	121	0.036	100	0.020	89
DCP15	.800	0.477	0.280	20	0.134	312	0.094	260	0.073	194	0.046	155	0.022	58	0.007	247	0.033	93	0.013	47
DCP16	.900	0.204	0.150	20	0.082	308	0.051	253	0.049	165	0.025	143	0.023	65	0.019	68	0.015	53	0.015	333
DCP17	.969	0.044	0.081	42	0.038	298	0.033	276	0.026	183	0.022	138	0.021	93	0.011	66	0.011	51	0.000	351

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                     FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0         45.51       0.228       0.300       2.71        0.0         19.89       12099.9     20

            V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             101.5       27488.      0.49E 07   -0.196       1.303       20.35      -0.00444     3.744       0.0
            (332.9)     (574.1)
                                                             HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            19.891     2.713   0   0.040 331   0.075 160   0.029 147   0.028 359   0.009 344   0.015 189   0.013 154   0.010 346
CN                1.018     0.314  86   0.033 110   0.031  72   0.003 351   0.014 293   0.006 331   0.004 356   0.003 202   0.002 195
CM               -0.097     0.075 233   0.010 252   0.008 202   0.003 186   0.004  86   0.003 125   0.001 131   0.001  29   0.001 267

DCP 1    .010     2.679     1.342 176   0.203 265   0.105 213   0.054 314   0.017  41   0.015 189   0.015  56   0.019 200   0.040 311
DCP 2    .020     2.248     0.732 171   0.311 300   0.101  80   0.052 330   0.086 107   0.064 218   0.026 134   0.056 265   0.050  18
DCP 3    .030     1.803     0.333 128   0.095 240   0.035  27   0.021  18   0.010 101   0.044 262   0.018 315   0.004 348   0.008 121
DCP 4    .049     2.630     0.668 148   0.079 218   0.023 195   0.050 280   0.026 318   0.010 260   0.011  70   0.021 355   0.013 323
DCP 5    .074     2.165     0.483 122   0.062 210   0.033 103   0.015 347   0.025 339   0.013 356   0.010  49   0.013 273   0.012 235
DCP 6    .099     1.879     0.398 105   0.071 185   0.042 102   0.006 111   0.017 338   0.005  45   0.008  40   0.011 278   0.014 214
DCP 7    .149     1.600     0.344  88   0.073 121   0.048  85   0.019 136   0.007 338   0.008 117   0.009 336   0.005 172   0.006  76
DCP 8    .200     1.409     0.363 100   0.097 133   0.062 148   0.014 198   0.007 242   0.003 169   0.007 140   0.004  13   0.002  83
DCP 9    .250     1.290     0.368  97   0.050 135   0.046 112   0.021 220   0.003 291   0.009 236   0.020  33   0.021 178   0.014 239
DCP10    .300     1.223     0.386  93   0.051 148   0.058 100   0.024 208   0.019 316   0.015 115   0.011 316   0.012 108   0.025 208
DCP11    .399     1.124     0.427  89   0.069 130   0.067  92   0.019 175   0.030 312   0.026  57   0.013 346   0.012  71   0.026 208
DCP12    .501     0.977     0.415  78   0.078 110   0.068  70   0.019 107   0.034 307   0.028  28   0.008 228   0.007  10   0.013 112
DCP13    .600     0.808     0.401  70   0.068  93   0.052  46   0.020  53   0.030 275   0.027   0   0.005  65   0.005 174   0.018  50
DCP14    .701     0.765     0.381  60   0.056  62   0.042  16   0.024   7   0.012 287   0.025 292   0.007  20   0.013 201   0.009   8
DCP15    .800     0.588     0.308  51   0.036  30   0.031 341   0.030 338   0.016 248   0.029 279   0.006 324   0.006 240   0.004 244
DCP16    .900     0.263     0.195  48   0.017  19   0.023 347   0.017 343   0.007 211   0.009 237   0.007 215   0.008 238   0.002  19
DCP17    .969     0.061     0.084  54   0.002 157   0.009 351   0.006 301   0.016 209   0.019 221   0.008 343   0.010 237   0.002 339


                     FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0         68.99       0.320       0.310       5.11        0.0         0.92        12131.1     20

            V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             108.8       29940.      0.59E 07   -0.330       0.313       5.10       -0.00001     0.765       0.0
            (356.8)     (625.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.923     5.113   0   0.137 330   0.116 190   0.010  97   0.015 217   0.026  71   0.009  86   0.005 156   0.010 315
CN                0.118     0.188  16   0.011   9   0.035 267   0.003 191   0.023 296   0.002 329   0.001 176   0.002 327   0.001   9
CM               -0.019     0.029 208   0.003 264   0.032 119   0.001 257   0.031 155   0.031 128   0.001 351   0.001 190   0.001 163

DCP 1    .010    -0.900     1.370 347   0.363 339   0.026  60   0.016  75   0.035 196   0.098 353   0.009  29   0.007 266   0.035  80
DCP 2    .020    -0.314     1.318 353   0.268 335   0.015 216   0.030 113   0.014 292   0.012  13   0.011  16   0.033 276   0.032 183
DCP 3    .030    -0.026     0.857 357   0.030 319   0.016 235   0.025 101   0.007 215   0.001  19   0.011  17   0.035 338   0.036  95
DCP 4    .049     0.085     0.605 356   0.033 317   0.036 232   0.014  78   0.026 188   0.037 186   0.008 359   0.013  17   0.035 125
DCP 5    .074     0.196     0.565 356   0.025 323   0.016 186   0.011  91   0.003 139   0.001 286   0.025  61   0.035 268   0.001  83
DCP 6    .099     0.228     0.470 357   0.010 331   0.011 311   0.010  92   0.006 291   0.031 276   0.039  37   0.007  14   0.006  63
DCP 7    .149     0.233     0.369   1   0.018 330   0.013 187   0.003 188   0.033 316   0.026   7   0.036  17   0.038  40   0.036 291
DCP 8    .200     0.195     0.308  13   0.017   0   0.035 280   0.007 280   0.009 337   0.036 160   0.007 128   0.038  57   0.036 128
DCP 9    .250     0.178     0.268  17   0.016 348   0.039 255   0.036 217   0.013 263   0.036  41   0.036 266   0.036  85   0.006 237
DCP10    .300     0.176     0.215  16   0.016 337   0.038 232   0.036  79   0.000 235   0.001 331   0.022 217   0.006 135   0.001  93
DCP11    .399     0.169     0.180  97   0.015  71   0.035 247   0.001 216   0.002 297   0.005 151   0.008 106   0.035   1   0.031  92
DCP12    .501     0.135     0.166  62   0.015  55   0.030 135   0.019 177   0.035 297   0.037 166   0.016 293   0.036 297   0.039 231
DCP13    .600     0.167     0.127  55   0.013  90   0.036 266   0.037 112   0.001 332   0.038  16   0.032 283   0.013 267   0.007  90
DCP14    .701     0.096     0.093  61   0.012  78   0.019 281   0.010  76   0.008  96   0.038 317   0.037 135   0.032  15   0.033 356
DCP15    .800     0.080     0.077  73   0.008  66   0.037 273   0.037  63   0.038  17   0.036 297   0.037  97   0.038 300   0.007 306
DCP16    .900    -0.071     0.036 177   0.013  78   0.016 369   0.008 269   [illegible] 338   0.038 269   0.036 301   0.036  86   0.031   6
DCP17    .969    -0.036     0.015 197   0.006 179   0.013 193   0.008  63   [illegible] 270   0.035 131   0.030 266   0.036 265   0.017   9
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL      NLR 1

              TUNNEL HZ    DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H     ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0          69.44        0.329         0.711        1.11         0.0        7.49        12101.7       20

              V            Q            RN            CM(WIND)     CN(MAX)      ALPHA,MAX  AERO DAMP     TRB          EXT DAMP
              105.8        28666.         2.40E 07    -0.035        0.526        8.60      -0.00078      2.499         0.0
             (347.2)      (598.7)
                                                        HARMONIC ANALYSIS
DATA
TYPE     X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              2.403     0.120   0    0.115 312    0.008 194    0.023  98    0.021 215    0.094  66    0.015  66    0.031 326    0.032 207
CN                 0.390     0.105  16    0.090  17    0.036 339    0.009 193    0.003 295    0.032 163    0.099 177    0.006 316    0.001 106
CM                -0.016     0.029 290    0.092 276    0.002 191    0.001 270    0.001 195    0.031  19    0.031 348    0.031 113    0.027  65

CP 1    .010       0.567     1.962 341    0.369 167    0.069  29    0.012 169    0.322 166    0.066  27    0.014  17    0.009 120    0.019 347
CP 2    .029       0.878     1.962 357    0.041 336    0.018 331    0.036 117    0.011 213    0.035  18    0.096 331    0.039 176    0.027  66
CP 3    .033       0.063     0.804 347    0.378 311    0.018 315    0.032 122    0.017 276    0.036   6    0.039 319    0.079 156    0.006  76
CP 4    .049       0.803     0.717 353    0.329 311    0.015 215    0.031  92    0.007 280    0.006 165    0.006  82    0.031 168    0.009  21
CP 5    .076       0.850     0.687 356    0.395 371    0.011 267    0.039 169    0.032 377    0.032  60    0.039 328    0.036 127    0.006 357
CP 6    .099       0.487     0.677 300    0.396 362    0.017 306    0.016 184    0.006 281    0.007 327    0.096  96    0.037 352    0.037 257
CP 7    .165       0.565     0.566   0    0.019 311    0.011 376    0.057  63    0.006  80    0.008 171    0.006  60    0.095 207    0.006 311
CP 8    .223       0.536     0.300  13    0.037 310    0.038 317    0.033  23    0.035 376    0.098  66    0.013 170    0.098 366    0.073 193
CP 9    .250       0.469     0.268  13    0.016 367    0.091 318    0.003 127    0.071 137    0.037 131    0.034 117    0.096 106    0.073 316
CP10    .300       0.417     0.197  16    0.037  66    0.033   3    0.014 265    0.007 257    0.371  13    0.026 305    0.037 306    0.065 110
CP11    .350       0.377     0.177  95    0.096 327    0.300 337    0.036 169    0.013 317    0.033 316    0.038 117    0.036 313    0.036 277
CP12    .501       0.376     0.164  67    0.012  56    0.037 316    0.072 131    0.016 303    0.035 176    0.036 364    0.036  76    0.036  16
CP13    .600       0.267     0.013  66    0.390   7    0.330  16    0.027  70    0.010 120    0.026 167    0.033 104    0.326 362    0.019 205
CP14    .701       0.283     0.096  67    0.017  82    0.013  96    0.096 196    0.010 336    0.396 273    0.007 144    0.096  60    0.006  33
CP15    .800       0.126     0.366  87    0.036  77    0.017 366    0.096 357    0.004 362    0.007 360    0.007 176    0.035  13    0.003 117
CP16    .900      -0.027     0.097 173    0.017 355    0.036 169    0.036   2    0.037 201    0.030 264    0.039  73    0.007  90    0.039 171
CP17    .963      -0.069     0.022 330    0.037  66    0.017 336    0.035 221    0.031 173    0.007  53    0.036  32    0.011 306    0.001 170
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL      NLR 1

              TUNNEL HZ    DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H     ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0          69.38        0.337         0.694        1.11         0.0        6.98        12171.7       20

              V            Q            RN            CM(WIND)     CN(MAX)      ALPHA,MAX  AERO DAMP     TRB          EXT DAMP
              103.2        27435.         2.40E 07    -0.036        0.796        7.98      -0.00087      0.741         0.0
             (338.6)      (573.0)
                                                        HARMONIC ANALYSIS
DATA
TYPE     X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              6.989     0.113   0    0.171 306    0.008 198    0.015  96    0.021 286    0.060  67    0.007 118    0.006 255    0.010 356
CN                 0.569     0.193  16    0.313 356    0.035 275    0.001 257    0.036   7    0.034 119    0.031  37    0.092 286    0.002   8
CM                -0.012     0.023 290    0.002 229    0.031 118    0.090 326    0.002 185    0.001 293    0.003 281    0.039 161    0.031 169

CP 1    .010       1.756     1.293 342    0.065 326    0.033 261    0.052 226    0.016  96    0.010 128    0.016 369    0.019  60    0.019 363
CP 2    .023       2.073     1.072 353    0.368 300    0.016 188    0.036  61    0.005 162    0.006  95    0.004 356    0.092 264    0.097 164
CP 3    .030       1.808     0.916 352    0.090 317    0.014 198    0.005  68    0.007 216    0.010  35    0.006  56    0.036 305    0.013 231
CP 4    .049       1.778     0.756 356    0.037 300    0.013 257    0.305 164    0.036  51    0.011  69    0.005  56    0.006 232    0.002 237
CP 5    .076       1.587     0.601 356    0.029 320    0.019 272    0.356 282    0.002 329    0.035 126    0.073 365    0.005 310    0.002 193
CP 6    .099       1.403     0.482   0    0.021 356    0.335 256    0.005 318    0.009  27    0.007 188    0.075 178    0.032 169    0.036 172
CP 7    .169       1.098     0.386   3    0.323 360    0.036 261    0.030 226    0.010 366    0.002  95    0.003 138    0.033 276    0.002  96
CP 8    .200       0.906     0.330  11    0.023 351    0.013 313    0.003 336    0.002 365    0.016 161    0.002 306    0.014 376    0.035 175
CP 9    .250       0.781     0.262  13    0.016 323     .300 261    0.010 260    0.001 288    0.012 132    0.035 336    0.010 378    0.035 208
CP10    .300       0.708     0.239  17    0.300 357     .308 267    0.036  25    0.308   7    0.031 198    0.008 360    0.005 168    0.007 351
CP11    .300       0.586     0.188  35    0.013  60    0.035 238    0.072 313    0.308  61    0.006 151    0.005  60    0.006 259    0.013  98
CP12    .501       0.417     0.168  66    0.313 350    0.305 367    0.002 262    0.306 315    0.003 131    0.005 327    0.032  16    0.036  29
CP13    .600       0.307     0.127  61    0.313  33    0.036 329    0.007 106    0.008  39    0.079 138    0.006 106    0.006 283    0.036  19
CP14    .701       0.367     0.098  68    0.315 352    0.039 282    0.031 282    0.015 335    0.009  27    0.038 175    0.035 252    0.032 286
CP15    .800       0.186     0.066  90    0.321  33    0.012 302    0.007 140    0.013 351    0.038 136    0.075 363    0.035  33    0.033 267
CP16    .900      -0.067     0.038 111    0.306   0    0.033 191    0.002 191    0.008 110    0.031 367    0.007  78    0.001 166    0.008 325
CP17    .969      -0.069     0.017 170    0.036 166    0.033 177    0.033 268    0.006 337    0.008 169    0.036  55    0.017  10    0.010 161
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

   [illegible]

    102.0         26856.
   (334.5)       (560.9)
                                          HARMONIC ANALYSIS
DATA
TYPE      [illegible]

ALPHA     [illegible]
CN        [illegible]
CM        [illegible]

[illegible]


                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

   [illegible]

    101.5         26660.
   (332.9)       (556.8)
                                          HARMONIC ANALYSIS
DATA
TYPE      [illegible]

ALPHA     [illegible]
CN        [illegible]
CM        [illegible]

[illegible]
```

[illegible]

101.4
(332.6)

26621.
(556.0)

[illegible]

[illegible]

101.2
(332.1)

26607.
(555.7)

[illegible]

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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H       ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0         68.28        0.344        0.298        3.00        0.0         17.36        12101.8       20

               V            Q            RN           CM(MIN)      CN(MAX)     ALPHA.NMAX  AERO DAMP    TOR          EXT DAMP
                                          0.48E 07    -0.268        1.954       20.51       0.00294     -2.531         0.0
                100.9        26526.
               (331.2)      (554.0)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              17.357    2.999   0    0.289 347    0.086 149    0.023 144    0.002  85    0.015   5    0.009  49    0.003  73    0.006 131
CN                  1.248    0.525  30    0.154 285    0.065 204    0.015  83    0.009 186    0.015 121    0.003  50    0.003  77    0.002  81
CM                 -0.080    0.114 149    0.056  76    0.014 329    0.013 236    0.007 164    0.001  10    0.002 118    0.003 110    0.001   4

DCP 1     .010      3.202    2.136 116    0.446  72    0.521 116    0.304  74    0.132  29    0.080 323    0.081 271    0.078 185    0.013  56
DCP 2     .020      3.710    1.904 114    0.301  31    0.435 121    0.261  56    0.110  62    0.035  67    0.068  96    0.050  47    0.023  33
DCP 3     .030      3.306    1.729 115    0.187  67    0.345 134    0.128  88    0.147  91    0.092 101    0.094  92    0.091  97    0.065  83
DCP 4     .069      3.402    1.247  93    0.529  20    0.126 312    0.140 322    0.126 255    0.028 193    0.040 257    0.046 205    0.033 200
DCP 5     .074      2.914    1.140  77    0.302 356    0.090 292    0.122 331    0.098 228    0.044 179    0.037 200    0.060 141    0.036  83
DCP 6     .099      2.568    1.090  67    0.337 341    0.098 279    0.097 299    0.073 217    0.027 190    0.022 193    0.009 126    0.015 136
DCP 7     .149      2.134    1.050  48    0.352 330    0.158 268    0.086 272    0.092 217    0.052 155    0.021 116    0.006  71    0.014  37
DCP 8     .200      1.833    0.965  48    0.421 332    0.133 259    0.084 292    0.114 219    0.049 163    0.022 138    0.023 119    0.006 175
DCP 9     .250      1.668    0.954  35    0.450 318    0.176 246    0.119 243    0.096 177    0.071 144    0.044  82    0.030  49    0.013   5
DCP10     .300      1.529    0.880  29    0.436 307    0.160 243    0.116 215    0.079 158    0.069 110    0.055  72    0.034   5    0.016 303
DCP11     .399      1.357    0.822  25    0.405 301    0.194 237    0.151 182    0.076 132    0.054  82    0.027  72    0.026  54    0.029 338
DCP12     .501      1.088    0.682   8    0.324 264    0.169 204    0.155 125    0.094  78    0.070  17    0.051 122    0.032 235    0.013 175
DCP13     .600      0.904    0.619 352    0.327 336    0.149 172    0.160  89    0.097  22    0.051 321    0.051 267    0.027 153    0.008 149
DCP14     .701      0.760    0.532 336    0.299 292    0.124 127    0.130  36    0.080 319    0.037 271    0.008 243    0.015 103    0.006  19
DCP15     .800      0.556    0.387 322    0.266 177    0.090  91    0.106   1    0.042 275    0.033 163    0.006 227    0.017 347    0.009 170
DCP16     .900      0.221    0.155 317    0.125 168    0.030  83    0.068 344    0.045 261    0.020 126    0.001 355    0.036 278    0.012 116
DCP17     .969      0.277    0.088 332    0.089 161    0.050  42    0.028 302    0.017 354    0.030 241    0.031 105    0.021 304    0.015 213

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H       ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0         68.29        0.346        0.297        3.00        0.0         19.91        12101.9       20

               V            Q            RN           CM(MIN)      CN(MAX)     ALPHA.NMAX  AERO DAMP    TOR          EXT DAMP
                                          0.49E 07    -0.279        1.769       22.20      -0.00106      1.632         0.0
                100.6        26368.
               (330.0)      (550.7)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              19.914    2.995   0    0.032 326    0.108 215    0.021 148    0.063  65    0.018  67    0.009 316    0.003 183    0.006  64
CN                  1.125    0.686  50    0.119 351    0.152 263    0.015 176    0.006   1    0.036 158    0.001  77    0.006 338    0.003 360
CM                 -0.110    0.100 233    0.030 130    0.013  53    0.005 336    0.001 320    0.001 278    0.002 315    0.002  74    0.001 184

DCP 1     .010      2.329    1.333 167    0.327 132    0.152 230    0.067 152    0.057 244    0.033 261    0.042 310    0.032 327    0.011 212
DCP 2     .020      2.873    1.318 136    0.126 220    0.072 256    0.055 227    0.033   0    0.015 269    0.021  73    0.031 195    0.009 163
DCP 3     .030      2.620    0.876  98    0.163 153    0.030 256    0.008  84    0.032   3    0.031 144    0.009 168    0.017 173    0.007 196
DCP 4     .069      2.386    0.526 119    0.112   0    0.069 331    0.068 301    0.063 331    0.036 227    0.033 226    0.040 173    0.027 129
DCP 5     .074      2.220    0.537  72    0.161   8    0.052 313    0.025 307    0.033 276    0.038 292    0.017 162    0.031 168    0.020 126
DCP 6     .099      1.872    0.585  59    0.182  16    0.056 290    0.032 260    0.028 282    0.029 330    0.036 170    0.018  65    0.035 184
DCP 7     .149      1.653    0.566  57    0.190   6    0.066 335    0.016 276    0.011 267    0.030 233    0.011 113    0.019 156    0.019  33
DCP 8     .200      1.525    0.522  60    0.230  38    0.067 328    0.005  99    0.017  68    0.014 169    0.002  65    0.012  76    0.018 331
DCP 9     .250      1.485    0.469  62    0.215  25    0.042 301    0.029 161    0.023  35    0.017 125    0.013 245    0.010   1    0.016 312
DCP10     .300      1.410    0.443  55    0.190  12    0.055 286    0.025 116    0.016  63    0.006  63    0.006 288    0.016 180    0.033 105
DCP11     .399      1.312    0.486  54    0.205  18    0.082 339    0.011 208    0.017  58    0.011 168    0.009 261    0.031 301    0.010 204
DCP12     .501      1.121    0.459  63    0.188 356    0.087 244    0.027 185    0.014  40    0.020  86    0.032  60    0.016 268    0.015 276
DCP13     .600      0.970    0.400  35    0.186 336    0.080 263    0.036 212    0.005 322    0.013  62    0.010 157    0.010 256    0.020 232
DCP14     .701      0.850    0.514  37    0.165 305    0.069 332    0.036 175    0.012 219    0.008 307    0.013 120    0.008 106    0.014  41
DCP15     .800      0.463    0.442  19    0.159 286    0.067 318    0.032 142    0.033 233    0.016 231    0.020  76    0.035 278    0.020  18
DCP16     .900      0.313    0.370  20    0.076 270    0.030 133    0.015 112    0.001  37    0.026 165    0.013 350    0.014 201    0.010  26
DCP17     .969      0.003    0.130  37    0.030 297    0.033 213    0.017  60    0.015 179    0.012 113    0.024 346    0.022 252    0.010 145
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0         23.03       0.085       0.408       2.63        0.0         0.00       12103.1      20

                V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
                 138.1       49020.      0.64E 07   -0.022       0.360       2.75       -0.00070     0.778       0.0
                (453.2)     (1023.8)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.002   2.631   0   0.368   3   0.057 213   0.036 135   0.022  30   0.011   2   0.010 160   0.015 132   0.010  20
CN                 0.119   0.242 353   0.005 357   0.001 143   0.001 192   0.001 183   0.001 299   0.001  52   0.000 108   0.001 127
CM                -0.015   0.006 305   0.000 164   0.000 312   0.000 267   0.000  81   0.000 198   0.000 277   0.001 290   0.000 351

DCP 1    .010     -0.594   1.648 347   0.061  33   0.017 122   0.005 178   0.007 207   0.003 246   0.003 298   0.012 262   0.002  44
DCP 2    .020     -0.365   1.241 350   0.025 352   0.009 140   0.011 194   0.006 242   0.002 234   0.004 314   0.013 288   0.003  70
DCP 3    .030     -0.077   1.038 350   0.019 313   0.003 117   0.007 197   0.004 249   0.002 243   0.004 316   0.006 290   0.002 156
DCP 4    .049      0.143   0.851 350   0.016 324   0.002  43   0.003 204   0.003 179   0.002 355   0.003  24   0.007 287   0.003 130
DCP 5    .074      0.274   0.697 350   0.012 335   0.001 192   0.001 271   0.001 138   0.004 357   0.001  23   0.006 296   0.004 127
DCP 6    .099      0.356   0.593 351   0.010 350   0.000 191   0.001 209   0.000 113   0.002 326   0.002 347   0.007 287   0.002 121
DCP 7    .149      0.247   0.430 351   0.010  13   0.007 318   0.007 235   0.003 144   0.004 336   0.003  57   0.006 315   0.001 185
DCP 8    .200      0.197   0.357 354   0.009 348   0.007 133   0.004 153   0.003 133   0.004 278   0.003 356   0.011 291   0.001  57
DCP 9    .250      0.176   0.315 353   0.003 334   0.001 257   0.003 178   0.003 155   0.001 191   0.002  71   0.003  52   0.003  88
DCP10    .300      0.182   0.268 352   0.005 358   0.001 109   0.003 102   0.002 157   0.002 306   0.001 209   0.002  60   0.001  86
DCP11    .399      0.164   0.211 358   0.006 358   0.001 208   0.003 190   0.003 339   0.004 275   0.001 355   0.004 148   0.003  92
DCP12    .501      0.118   0.164 359   0.004 349   0.004 179   0.002 249   0.002 217   0.002 219   0.002 154   0.002 147   0.003 277
DCP13    .600      0.146   0.124   1   0.004  88   0.003 177   0.002 247   0.001 284   0.001 277   0.002 131   0.006 114   0.003 315
DCP14    .701      0.206   0.086   2   0.003  18   0.002 157   0.002 324   0.001 207   0.002 232   0.001 249   0.002 142   0.002 140
DCP15    .800      0.084   0.054   9   0.002 317   0.002  67   0.001 164   0.002 159   0.003  19   0.004  34   0.005  93   0.002 126
DCP16    .900     -0.096   0.013   4   0.000 302   0.002  79   0.001  45   0.002 150   0.002 146   0.002  48   0.002 124   0.004 169
DCP17    .969     -0.065   0.009 158   0.002 276   0.001  26   0.004 115   0.006 343   0.007  24   0.002 190   0.004  78   0.001 325
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0         23.06       0.086       0.404       2.63        0.0         2.42       12103.2      20

                V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
                 136.2       47957.      0.64E 07   -0.020       0.616       5.01       -0.00070     0.769       0.0
                (446.7)     (1001.6)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.424   2.626   0   0.064   2   0.063 218   0.028 143   0.032  33   0.014  39   0.017 172   0.012 297   0.010 359
CN                 0.369   0.245 353   0.005   6   0.003 256   0.001 233   0.001 294   0.001  75   0.003 118   0.005 345   0.000 151
CM                -0.011   0.006 311   0.000 254   0.001  33   0.000  75   0.001 103   0.000 233   0.001 294   0.002 143   0.000 182

DCP 1    .010      1.043   1.586 347   0.028 353   0.038 283   0.000 111   0.002 238   0.003  43   0.004 189   0.013  71   0.006 161
DCP 2    .020      0.903   1.275 350   0.026 338   0.009 292   0.001 227   0.002 273   0.002  85   0.005 213   0.014  82   0.004 201
DCP 3    .030      0.994   1.085 350   0.023 355   0.010 302   0.001 240   0.001 124   0.001  87   0.004 222   0.010  63   0.003 166
DCP 4    .049      1.324   0.894 350   0.017 337   0.005 273   0.003  80   0.005  63   0.005 153   0.001 242   0.008  71   0.001 185
DCP 5    .074      0.994   0.719 350   0.013 337   0.007 298   0.006  52   0.003  58   0.001 161   0.003 186   0.006  89   0.005 190
DCP 6    .099      0.370   0.605 351   0.014 350   0.005 304   0.002 110   0.004  22   0.004 138   0.002 219   0.004  85   0.004 176
DCP 7    .149      0.708   0.453 351   0.007 347   0.004 276   0.005 222   0.005  94   0.007 177   0.001 297   0.007 107   0.002 149
DCP 8    .200      0.570   0.372 354   0.008   6   0.011 301   0.004  36   0.003 145   0.001 333   0.001 315   0.010  71   0.003 123
DCP 9    .250      0.500   0.316 353   0.008   9   0.003 230   0.001 320   0.001  69   0.002  24   0.002  74   0.008 349   0.000 289
DCP10    .300      0.462   0.263 354   0.009  24   0.003 252   0.003 180   0.000 229   0.006  20   0.002  13   0.006 305   0.001 278
DCP11    .399      0.384   0.212 358   0.007  21   0.003 210   0.003 226   0.004 299   0.004  68   0.003 137   0.010 327   0.000  31
DCP12    .501      0.286   0.161 358   0.004  37   0.005 212   0.004 234   0.006 287   0.000  89   0.006  92   0.007 301   0.002 153
DCP13    .600      0.272   0.122   1   0.004 358   0.003 225   0.003 155   0.003 264   0.002 157   0.003  87   0.008 334   0.001  14
DCP14    .701      0.295   0.084   2   0.002  29   0.001 199   0.003 286   0.002 293   0.004  36   0.006 124   0.006 343   0.002 295
DCP15    .800      0.134   0.049  10   0.003  67   0.001  91   0.002 346   0.004 157   0.001  41   0.004 132   0.006 353   0.003 274
DCP16    .900     -0.085   0.018  14   0.001  11   0.006 239   0.003 273   0.005 327   0.001 279   0.005 141   0.012 312   0.006  48
DCP17    .969     -0.049   0.011 191   0.002   1   0.002 333   0.002 162   0.002 295   0.004  93   0.006  89   0.006 345   0.001  37
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                    TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
                      0.0       23.12       0.087       0.400      2.63       0.0         4.89       12103.3      20

                    V          Q.          RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                     134.7      47090       0.63E 07  -0.015       0.968       7.55       -0.00088     0.951       0.0
                    (441.9)    (983.5)                                   HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA                 4.890    2.632   0  0.060   7  0.050 228  0.031 124  0.024  37  0.016  69  0.017 177  0.004  92  0.013  19
CN                    0.626    0.244 354  0.005  24  0.002  24  0.001 225  0.001 233  0.000 242  0.001 171  0.003  16  0.001  81
CM                   -0.006    0.008 310  0.001 258  0.001 193  0.000  70  0.000  20  0.000  92  0.001 291  0.001 222  0.000 270

DCP 1      .010       2.727    1.642 347  0.050 279  0.026 145  0.005  49  0.003 227  0.007  67  0.006 140  0.009 266  0.002 113
DCP 2      .020       2.234    1.295 350  0.022 327  0.007 116  0.003 240  0.005 141  0.007  79  0.002 152  0.008 293  0.002  24
DCP 3      .030       2.126    1.086 350  0.018 356  0.008 148  0.003 102  0.005 149  0.006  68  0.004 157  0.007 310  0.002 293
DCP 4      .049       1.977    0.923 350  0.015 333  0.001 295  0.001 156  0.001 218  0.003 113  0.005 226  0.005 265  0.001 131
DCP 5      .074       1.763    0.732 350  0.012 351  0.004 316  0.000  70  0.002 255  0.003  82  0.002 311  0.003 312  0.002 155
DCP 6      .099       1.627    0.603 351  0.009   8  0.004   2  0.001 183  0.001 226  0.004 104  0.004 266  0.002 290  0.002 162
DCP 7      .149       1.184    0.464 351  0.014  24  0.004 114  0.005 254  0.004 243  0.001 109  0.005 195  0.004 340  0.001 204
DCP 8      .200       0.960    0.367 354  0.006  21  0.002 349  0.002 194  0.004 333  0.002 156  0.005 270  0.003 291  0.003 270
DCP 9      .250       0.823    0.308 354  0.007  12  0.002  17  0.002 108  0.002 236  0.004 126  0.004  98  0.002  17  0.002  47
DCP10      .300       0.735    0.259 355  0.007  48  0.002  51  0.003 115  0.002 223  0.003 233  0.001 115  0.003  25  0.002  70
DCP11      .399       0.603    0.205 359  0.007  48  0.002 343  0.001  93  0.002 294  0.003 274  0.002 181  0.006  40  0.002  47
DCP12      .501       0.453    0.160   0  0.006  39  0.003 309  0.003 308  0.003 182  0.001  10  0.002  98  0.004   5  0.003  63
DCP13      .600       0.394    0.119   4  0.008  24  0.002  27  0.001  81  0.001  37  0.001 265  0.002 325  0.005  26  0.001 168
DCP14      .701       0.380    0.081   7  0.004  59  0.004  35  0.002 246  0.002 248  0.003 330  0.001  44  0.004  17  0.003 337
DCP15      .800       0.186    0.045  13  0.005  92  0.005  19  0.004 213  0.003  61  0.001 159  0.001 170  0.004  35  0.004  90
DCP16      .900      -0.068    0.019  22  0.003 348  0.002 324  0.002 309  0.002 210  0.004 273  0.003 102  0.002  13  0.002 210
DCP17      .969      -0.062    0.005 193  0.004 124  0.005  68  0.001 198  0.002 216  0.002 202  0.004 203  0.010  69  0.005 107


                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                    TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
                      0.0       23.01       0.088       0.396      2.63       0.0         7.39       12103.4      20

                    V          Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                     133.3      46319.      0.63E 07  -0.009       1.087      10.02       -0.00114     1.216       0.0
                    (437.3)    (967.4)                                   HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA                 7.386    2.634   0  0.060  14  0.051 233  0.023 119  0.024  27  0.013  70  0.015 172  0.001  63  0.010   0
CN                    0.873    0.229 358  0.021  28  0.011 291  0.002 132  0.001 252  0.002 127  0.001 293  0.004  45  0.001  87
CM                    0.002    0.012 221  0.003 221  0.002 193  0.000 254  0.000  27  0.000 306  0.001  91  0.001 206  0.000 126

DCP 1      .010       4.705    2.362 349  0.080 297  0.144 326  0.097 234  0.021 180  0.026 197  0.024 108  0.011  88  0.013  82
DCP 2      .020       3.569    1.798 353  0.119 300  0.141 177  0.131  77  0.053 347  0.016  71  0.029 334  0.023 226  0.015 152
DCP 3      .030       3.293    0.974 351  0.074  43  0.036 333  0.014  78  0.010 341  0.008 239  0.008 132  0.010 109  0.003  82
DCP 4      .049       2.895    0.817 352  0.074  46  0.030 331  0.007 236  0.004 238  0.004  91  0.005  83  0.005  58  0.004  20
DCP 5      .074       2.502    0.658 352  0.048  37  0.015 326  0.005 235  0.003 188  0.000  65  0.002  78  0.006  74  0.001  26
DCP 6      .099       2.213    0.563 354  0.035  36  0.014 314  0.004 171  0.002 196  0.002  47  0.004  99  0.003  87  0.001  57
DCP 7      .149       1.651    0.413 354  0.028  19  0.007 295  0.002 136  0.003 301  0.004  73  0.001 291  0.005  91  0.000 227
DCP 8      .200       1.333    0.340 358  0.021  24  0.003 296  0.002 154  0.001   5  0.001 122  0.003 318  0.005 149  0.005 108
DCP 9      .250       1.137    0.286 357  0.018  22  0.009 276  0.003 167  0.004  52  0.003 167  0.003 174  0.005  31  0.005  58
DCP10      .300       1.001    0.233 357  0.019  19  0.013 272  0.002  85  0.001  68  0.003 123  0.002 236  0.003  34  0.002  34
DCP11      .399       0.813    0.185   3  0.021  33  0.011 297  0.005 114  0.001 137  0.002 133  0.001  55  0.005  51  0.001 159
DCP12      .501       0.612    0.137   7  0.021  31  0.009 290  0.001 336  0.002 207  0.001 139  0.001 320  0.005  46  0.002 141
DCP13      .600       0.505    0.095  16  0.021  42  0.012 299  0.003 226  0.002 121  0.000  88  0.001  58  0.007   0  0.004 107
DCP14      .701       0.452    0.052  27  0.023  35  0.011 285  0.003 144  0.001 231  0.001 139  0.004 273  0.005  47  0.001 302
DCP15      .800       0.219    0.031  43  0.018  46  0.012 283  0.002 234  0.002 193  0.005  93  0.005 285  0.005  29  0.001 329
DCP16      .900      -0.056    0.011  45  0.011  20  0.010 272  0.003  50  0.003 293  0.005 212  0.003 264  0.006 344  0.001 312
DCP17      .969      -0.067    0.003  64  0.007  13  0.005 332  0.002  39  0.005 219  0.004  67  0.002 208  0.008  91  0.001 293
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.08	0.089	0.395	2.64	0.0	9.87	12103.5	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TOR	EXT DAMP
132.8 (435.6)	46070. (962.2)	0.63E 07	-0.002	1.214	11.96	-0.00157	1.678	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.868	2.641 0	0.066 16	0.049 224	0.014 106	0.025 7	0.005 232	0.011 141	0.015 56	0.008 350
CN		1.015	0.115 42	0.072 28	0.016 263	0.003 157	0.004 236	0.004 141	0.003 69	0.007 43	0.002 241
CM		0.011	0.014 305	0.007 108	0.006 355	0.004 262	0.001 183	0.001 220	0.000 59	0.002 211	0.001 65
DCP 1	.010	5.777	0.500 342	0.766 94	0.166 61	0.023 14	0.074 125	0.013 47	0.009 45	0.012 3	0.018 287
DCP 2	.020	4.551	0.820 9	0.270 66	0.328 16	0.122 311	0.102 352	0.050 345	0.058 342	0.022 25	0.021 351
DCP 3	.030	4.077	0.725 16	0.269 19	0.114 340	0.134 299	0.086 256	0.055 239	0.038 213	0.024 167	0.011 168
DCP 4	.049	3.470	0.346 22	0.248 46	0.084 332	0.071 278	0.054 230	0.029 203	0.019 193	0.022 140	0.015 148
DCP 5	.074	2.922	0.226 25	0.213 53	0.072 328	0.049 252	0.032 192	0.017 132	0.006 63	0.008 107	0.004 159
DCP 6	.099	2.540	0.175 32	0.193 55	0.044 330	0.040 249	0.020 190	0.009 132	0.005 103	0.009 96	0.003 110
DCP 7	.149	1.947	0.235 29	0.145 22	0.064 278	0.032 204	0.010 177	0.014 170	0.021 109	0.020 47	0.007 336
DCP 8	.200	1.590	0.232 31	0.126 11	0.066 267	0.034 193	0.014 161	0.019 129	0.003 65	0.014 15	0.005 245
DCP 9	.250	1.363	0.191 34	0.110 9	0.060 249	0.028 162	0.006 102	0.013 120	0.016 55	0.013 350	0.006 251
DCP10	.300	1.158	0.152 39	0.088 8	0.039 240	0.017 134	0.002 108	0.011 113	0.010 12	0.004 2	0.002 155
DCP11	.399	0.925	0.118 56	0.072 14	0.030 233	0.016 109	0.009 311	0.009 167	0.005 56	0.007 48	0.003 167
DCP12	.501	0.686	0.095 70	0.062 17	0.023 228	0.016 89	0.005 313	0.001 71	0.001 334	0.007 53	0.002 14
DCP13	.600	0.531	0.085 100	0.052 19	0.020 235	0.016 72	0.008 304	0.003 167	0.003 170	0.006 57	0.001 299
DCP14	.701	0.438	0.092 125	0.032 23	0.024 171	0.020 61	0.007 284	0.003 148	0.003 290	0.008 30	0.002 336
DCP15	.800	0.223	0.051 103	0.018 321	0.019 154	0.012 60	0.003 135	0.005 34	0.006 246	0.007 50	0.003 242
DCP16	.900	-0.025	0.065 26	0.030 254	0.015 141	0.001 230	0.003 158	0.007 11	0.005 139	0.012 26	0.008 248
DCP17	.969	-0.051	0.031 4	0.019 276	0.007 156	0.004 120	0.006 69	0.002 276	0.001 357	0.000 337	0.004 189

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.03	0.085	0.405	2.52	0.0	12.43	12105.1	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TOR	EXT DAMP
137.3 (450.4)	48675. (1010.6)	0.64E 07	-0.049	1.200	12.13	-0.00115	1.264	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.432	2.521 0	0.055 30	0.060 127	0.046 115	0.027 197	0.027 290	0.053 248	0.042 209	0.007 56
CN		1.014	0.145 104	0.016 107	0.028 90	0.014 84	0.010 312	0.007 290	0.009 224	0.007 192	0.002 89
CM		-0.008	0.035 193	0.009 93	0.007 157	0.003 163	0.004 100	0.002 109	0.002 350	0.001 20	0.000 180
DCP 1	.010	5.388	1.176 194	0.172 103	0.115 241	0.021 176	0.034 359	0.058 27	0.091 353	0.036 277	0.022 100
DCP 2	.020	4.436	0.872 162	0.248 130	0.110 204	0.028 168	0.034 263	0.043 17	0.060 357	0.034 301	0.017 72
DCP 3	.030	3.899	0.538 140	0.325 125	0.219 162	0.175 160	0.086 175	0.027 183	0.024 290	0.031 278	0.012 313
DCP 4	.049	3.217	0.568 153	0.225 108	0.121 137	0.096 135	0.004 59	0.044 267	0.048 248	0.021 245	0.013 253
DCP 5	.074	2.662	0.561 152	0.168 95	0.115 121	0.083 98	0.026 40	0.012 281	0.023 243	0.013 197	0.006 176
DCP 6	.099	2.331	0.514 146	0.124 80	0.105 115	0.055 68	0.020 319	0.014 259	0.028 249	0.016 208	0.009 221
DCP 7	.149	1.941	0.380 121	0.071 70	0.121 104	0.043 73	0.022 89	0.004 268	0.019 218	0.014 174	0.010 153
DCP 8	.200	1.555	0.304 106	0.048 62	0.099 89	0.020 76	0.022 81	0.002 47	0.016 160	0.021 130	0.011 95
DCP 9	.250	1.364	0.253 93	0.028 41	0.074 65	0.015 44	0.027 3	0.009 272	0.004 195	0.007 133	0.009 58
DCP10	.300	1.178	0.213 94	0.006 14	0.063 66	0.024 78	0.023 3	0.001 312	0.009 212	0.016 138	0.008 104
DCP11	.399	0.961	0.179 72	0.021 280	0.044 49	0.011 55	0.024 329	0.008 313	0.015 241	0.010 160	0.005 40
DCP12	.501	0.740	0.146 61	0.022 253	0.033 27	0.010 44	0.023 299	0.005 298	0.008 274	0.005 165	0.007 37
DCP13	.600	0.589	0.117 59	0.038 240	0.027 3	0.005 61	0.027 290	0.010 272	0.010 186	0.010 241	0.006 159
DCP14	.701	0.462	0.085 57	0.040 246	0.022 340	0.003 243	0.020 267	0.009 303	0.011 187	0.004 242	0.002 56
DCP15	.800	0.278	0.097 20	0.015 247	0.020 326	0.011 31	0.014 263	0.013 296	0.009 194	0.006 205	0.003 30
DCP16	.900	0.045	0.106 6	0.014 8	0.011 290	0.013 359	0.005 244	0.007 262	0.003 90	0.011 200	0.004 278
DCP17	.969	-0.010	0.051 0	0.011 18	0.007 282	0.002 328	0.004 235	0.005 336	0.004 137	0.004 227	0.006 267

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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0         23.10        0.087        0.400        2.49         0.0          14.85        12105.2       20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
               134.9         47138.       0.63E 07    -0.086        1.174        14.00       -0.00193      2.090        0.0
              (442.7)       (984.5)
                                                               HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              14.846     2.494   0    0.053  10    0.029 202    0.014 114    0.014 316    0.017 281    0.006   2    0.012 277    0.011 340
CN                  1.019     0.115  95    0.025 159    0.012 220    0.006 159    0.008 231    0.004 172    0.002 193    0.005 211    0.004  53
CM                 -0.035     0.068 194    0.010 230    0.003 295    0.004 279    0.002 297    0.001 225    0.000 176    0.002  64    0.000 225

DCP 1     .010      4.689     1.274 191    0.098 305    0.024 149    0.044 303    0.057 285    0.053 223    0.019 231    0.029 130    0.015 357
DCP 2     .020      3.977     0.974 180    0.175 248    0.066 307    0.018 338    0.065 300    0.020 290    0.022 288    0.035 123    0.042  20
DCP 3     .030      3.600     0.813 174    0.267 221    0.167 284    0.090 324    0.067 338    0.021 339    0.013 198    0.014 141    0.038  42
DCP 4     .049      2.953     0.781 165    0.087 307    0.067 279    0.029 267    0.012 313    0.014 171    0.011 149    0.012 273    0.008  80
DCP 5     .074      2.427     0.592 157    0.095 236    0.037 231    0.050 241    0.031 247    0.021 193    0.002 331    0.008 185    0.028 114
DCP 6     .099      2.162     0.461 145    0.103 230    0.009 173    0.035 225    0.039 232    0.030 166    0.008 181    0.012 116    0.022  28
DCP 7     .149      1.769     0.305 135    0.127 197    0.024 240    0.027 262    0.027 250    0.012 161    0.020 174    0.012 152    0.009 306
DCP 8     .200      1.528     0.229 110    0.106 177    0.029 240    0.021 252    0.032 266    0.001 156    0.006 189    0.013 164    0.009 162
DCP 9     .250      1.365     0.203  86    0.095 142    0.032 232    0.013 186    0.031 227    0.018 195    0.004 123    0.007 102    0.005 100
DCP10     .300      1.199     0.186  70    0.076 141    0.029 235    0.014 199    0.025 233    0.014 195    0.006 145    0.002 226    0.006  62
DCP11     .399      1.018     0.195  51    0.069 125    0.036 238    0.036 158    0.011 133    0.013 219    0.013 266    0.012 228    0.012 112
DCP12     .501      0.797     0.173  43    0.037 100    0.022 164    0.016  88    0.008 159    0.011 173    0.010  14    0.009 279    0.009  49
DCP13     .600      0.636     0.164  34    0.026  64    0.015 136    0.015 100    0.007 167    0.010 137    0.003  90    0.010 259    0.003 287
DCP14     .701      0.527     0.160  33    0.027  35    0.013 120    0.023  86    0.007 152    0.004   6    0.005  91    0.006 279    0.004 317
DCP15     .800      0.378     0.136  19    0.036  29    0.010  56    0.012  94    0.006 148    0.009  53    0.002 158    0.006 306    0.007  17
DCP16     .900      0.136     0.095  19    0.026  32    0.033  95    0.039  96    0.006  57    0.009  22    0.005 304    0.009 205    0.002 163
DCP17     .969      0.038     0.044  21    0.011  36    0.007  26    0.005  88    0.002  23    0.005  60    0.002 251    0.006 212    0.002 166
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0         22.96        0.088        0.396        2.53         0.0          17.31        12105.3       20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
               133.5         46358.       0.61E 07    -0.104        1.137        16.19       -0.00199      2.133        0.0
              (438.1)       (968.2)
                                                               HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              17.310     2.526   0    0.061  17    0.036 215    0.013 169    0.021  24    0.017   7    0.013  73    0.006 151    0.002  51
CN                  0.991     0.118  96    0.016 174    0.022 200    0.009 163    0.022 316    0.006 273    0.006 310    0.007 296    0.002 316
CM                 -0.072     0.036 201    0.003 316    0.002  96    0.001  35    0.000  98    0.002  16    0.001 108    0.001  20    0.000 322

DCP 1     .010      3.920     0.725 182    0.160 305    0.068  87    0.065 237    0.035  15    0.015  56    0.036 226    0.020 293    0.053  33
DCP 2     .020      3.301     0.618 172    0.056 371    0.060  32    0.026 235    0.036  60    0.017 229    0.009  23    0.018 289    0.026  26
DCP 3     .030      2.967     0.697 183    0.051 355    0.036 249    0.018 164    0.030   9    0.021 292    0.036  13    0.007 290    0.001  29
DCP 4     .049      2.279     0.601 158    0.058 228    0.056 137    0.036 167    0.028 155    0.014 327    0.017 130    0.006   9    0.020 348
DCP 5     .074      1.911     0.433 139    0.068 196    0.020 141    0.032 147    0.016 191    0.014 290    0.006  35    0.013 325    0.022 305
DCP 6     .099      1.755     0.337 124    0.068 186    0.023 169    0.037 145    0.019 222    0.015 236    0.007  49    0.012   2    0.015 263
DCP 7     .149      1.536     0.269 112    0.067 180    0.005 113    0.026 132    0.009 226    0.013 185    0.005 233    0.012 355    0.005 267
DCP 8     .200      1.412     0.213 107    0.027 182    0.012 136    0.012 163    0.013  16    0.006 305    0.011 306    0.009 320    0.007 266
DCP 9     .250      1.332     0.188  91    0.026 126    0.019  71    0.007 144    0.008  19    0.009 229    0.006 337    0.006  86    0.006 365
DCP10     .300      1.214     0.166  90    0.017 136    0.012  20    0.033  78    0.037  17    0.033 357    0.013 324    0.007 309    0.005  27
DCP11     .399      1.075     0.148  68    0.019 165    0.009 265    0.002 278    0.008 281    0.008 333    0.016 302    0.002 218    0.007 255
DCP12     .501      0.807     0.132  56    0.018 178    0.013 242    0.005 170    0.009 326    0.003 357    0.003 120    0.005 128    0.005 167
DCP13     .600      0.751     0.132  44    0.020 169    0.011 249    0.010 170    0.002  18    0.009 237    0.002  62    0.006 179    0.002  63
DCP14     .701      0.640     0.122  35    0.016 157    0.005 238    0.006 172    0.005 212    0.012 232    0.007 208    0.005 252    0.006 363
DCP15     .800      0.487     0.116  29    0.011 158    0.005 298    0.005 232    0.003 323    0.016 179    0.006 283    0.006 302    0.006  36
DCP16     .900      0.278     0.076  35    0.006 114    0.008 323    0.007 216    0.003 200    0.012 211    0.006 269    0.030 159    0.003 189
DCP17     .965      0.061     0.027  47    0.006  91    0.006 271    0.005 175    0.006 170    0.008 231    0.005 337    0.006 237    0.003 288
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ    K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                  0.0         22.99       0.088         0.394        2.54         0.0          19.84        12105.4       20

                V            Q            RN            CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                 132.7        46037.       0.63E 07     -0.127        1.999        19.88       -0.00239      2.555         0.0
                (435.9)      (961.5)
                                                               HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                19.861    2.544   0    0.060  15    0.051 217    0.008  87    0.024  22    0.010  93    0.014 123    0.013 102    0.007   9
CN                    0.978    0.111  94    0.016 153    0.006 113    0.002 304    0.003 334    0.007 359    0.003 348    0.006 125    0.004 259
CM                   -0.096    0.023 221    0.005 262    0.002 240    0.002 200    0.001 197    0.001 150    0.001 157    0.000 179    0.007  45

DCP 1      .010       3.264    0.437 180    0.036 213    0.048 355    0.035 355    0.029  55    0.008 120    0.008 214    0.017 105    0.035  57
DCP 2      .020       2.695    0.616 175    0.060 128    0.075 318    0.022  11    0.012 319    0.003 344    0.023 138    0.019 146    0.029  95
DCP 3      .030       2.387    0.676 169    0.083 263    0.036 192    0.005 258    0.026 334    0.006 106    0.006 344    0.017 142    0.014 195
DCP 4      .049       1.898    0.271 138    0.069 258    0.066 145    0.020 276    0.018 280    0.015  23    0.005 128    0.026 153    0.013 317
DCP 5      .074       1.698    0.234 111    0.060 217    0.017 145    0.022 229    0.009 316    0.012  13    0.012  83    0.021 131    0.003  91
DCP 6      .099       1.636    0.230 106    0.048 205    0.016 169    0.018 205    0.011 255    0.018  31    0.005 239    0.013 127    0.002 300
DCP 7      .149       1.480    0.192  93    0.036 197    0.011 203    0.008 218    0.017 266    0.013  20    0.006 101    0.012 139    0.003 298
DCP 8      .200       1.362    0.159  93    0.025 216    0.007 207    0.014 303    0.009 346    0.010 347    0.009   8    0.014 168    0.002  20
DCP 9      .250       1.286    0.151  99    0.045 169    0.016 183    0.011 251    0.005 260    0.012 342    0.007  15    0.009  85    0.006 332
DCP10      .300       1.207    0.139  97    0.038 157    0.016 116    0.011 188    0.008 182    0.017 326    0.006 322    0.009 143    0.008 289
DCP11      .399       1.132    0.133  91    0.033 149    0.010 113    0.008 159    0.007 138    0.005 351    0.007 279    0.006 140    0.011 272
DCP12      .501       0.942    0.120  80    0.023 132    0.013  54    0.005  18    0.008  51    0.006  36    0.002 314    0.009 114    0.006 351
DCP13      .600       0.812    0.109  65    0.020 102    0.006  95    0.013 348    0.013  11    0.011  48    0.006  16    0.013  86    0.007 246
DCP14      .701       0.722    0.103  69    0.025  77    0.006  59    0.009  10    0.006  14    0.003 286    0.005 335    0.007  66    0.008 230
DCP15      .800       0.570    0.101  60    0.025  70    0.007 132    0.005  76    0.010 343    0.010 346    0.003 356    0.006 310    0.014 226
DCP16      .900       0.252    0.063  62    0.010  58    0.007  62    0.005  38    0.004 245    0.038 297    0.006 326    0.008 284    0.007 188
DCP17      .969       0.070    0.029  70    0.003 128    0.008  16    0.003 309    0.001 162    0.005 164    0.002 105    0.006 316    0.005 121


                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ    K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                  0.0         45.67       0.168         0.409        2.84         0.0          0.02         12107.1       20

                V            Q            RN            CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                 138.8        49379.       0.65E 07     -0.028        0.356        2.99        -0.00074      0.846         0.0
                (455.3)      (1031.3)
                                                               HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 0.022    2.840   0    0.088 359    0.179 251    0.036  98    0.021  71    0.010 171    0.011 127    0.009 189    0.011 342
CN                    0.123    0.225 357    0.005   1    0.006 312    0.009 117    0.002 271    0.001 267    0.003 172    0.001  44    0.002  76
CM                   -0.016    0.012 296    0.001 240    0.001 278    0.001 305    0.001 133    0.000 119    0.000  47    0.000 297    0.000 252

DCP 1      .010      -0.581    1.503 343    0.056  19    0.026 242    0.023  96    0.009 143    0.002 256    0.006  51    0.005  78    0.006 299
DCP 2      .020      -0.366    1.196 348    0.026 347    0.022 266    0.028 122    0.005 205    0.005 240    0.002 151    0.012  15    0.005   4
DCP 3      .030      -0.073    0.998 347    0.023 306    0.018 267    0.018 123    0.003 166    0.003 317    0.006 336    0.004 310    0.001 296
DCP 4      .049       0.163    0.816 348    0.020 307    0.019 283    0.017  98    0.003 185    0.003 157    0.004  22    0.004   7    0.004  63
DCP 5      .074       0.279    0.671 348    0.015 325    0.016 280    0.016  86    0.004 175    0.004 267    0.003 177    0.007 313    0.002  67
DCP 6      .099       0.356    0.567 350    0.012 329    0.014 293    0.018  97    0.008 207    0.001 262    0.006 261    0.005 324    0.003  89
DCP 7      .149       0.251    0.421 351    0.010  11    0.015 289    0.015 131    0.004 158    0.002 277    0.001 305    0.001 325    0.002 147
DCP 8      .200       0.208    0.344 359    0.011 347    0.007 307    0.017 101    0.002 142    0.005 260    0.004  40    0.004 356    0.006 349
DCP 9      .250       0.190    0.295 355    0.011 331    0.007 301    0.009 128    0.005 276    0.003  83    0.006 160    0.006  65    0.002 169
DCP10      .300       0.182    0.268 356    0.003  26    0.003 322    0.009 141    0.003 276    0.003 140    0.001 224    0.003  99    0.001 279
DCP11      .399       0.173    0.196   7    0.003  65    0.001 355    0.007 131    0.006 320    0.001 115    0.002 111    0.005 177    0.002 107
DCP12      .501       0.123    0.151  11    0.005  21    0.003 344    0.007 118    0.004 196    0.002 162    0.003 128    0.002 181    0.007 111
DCP13      .600       0.137    0.117  18    0.002  42    0.006 343    0.002 154    0.003 296    0.006 215    0.002 143    0.005  30    0.003 131
DCP14      .701       0.203    0.081  71    0.005  85    0.006   9    0.008 118    0.006 328    0.006 316    0.005   6    0.002 269    0.003  42
DCP15      .800       0.093    0.050  32    0.006   7    0.001  43    0.005  99    0.003 312    0.003 226    0.007 222    0.003  73    0.006   5
DCP16      .900      -0.089    0.016  68    0.001  42    0.007  46    0.011 121    0.003 301    0.007 312    0.002 270    0.003 278    0.003  89
DCP17      .965      -0.041    0.015 181    0.006   1    0.001 265    0.008 124    0.005 316    0.005  88    0.003  73    0.006 119    0.002 276
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0        45.70      0.171       0.404         2.84        0.0           2.42       12107.2       20

            V           Q            RN         CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
             136.5       48287.      0.64E 07   -0.026        0.593        5.31       -0.00075      0.850        0.0
            (447.7)     (1008.5)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.419    2.837   0   0.087 357   0.096 261   0.024  50   0.035  66   0.013  61   0.014 195   0.009 299   0.007 352
CN                  0.372    0.228 357   0.007  17   0.005 330   0.007   2   0.001  64   0.001 183   0.001 274   0.002 288   0.001  42
CM                 -0.011    0.012 294   0.001 244   0.001 271   0.002 173   0.001 196   0.000 258   0.000 114   0.001 130   0.000 216

DCP 1     .010      1.756    1.519 343   0.031 352   0.022 279   0.011   3   0.007 188   0.002  36   0.006 108   0.002 148   0.006 332
DCP 2     .020      0.919    1.219 348   0.029 345   0.016 296   0.010   9   0.005 170   0.004 166   0.004 232   0.006 170   0.005   5
DCP 3     .030      1.036    1.245 347   0.022 330   0.015 292   0.008  16   0.006 204   0.002  73   0.005 196   0.003  62   0.004  53
DCP 4     .049      1.369    0.955 349   0.016 323   0.013 311   0.007  65   0.004 217   0.002 185   0.007 183   0.002 309   0.001  28
DCP 5     .074      1.009    0.687 349   0.015 316   0.011 291   0.009  38   0.001 178   0.004 181   0.004 193   0.002  24   0.002  30
DCP 6     .099      0.976    0.576 349   0.016   5   0.016 338   0.001 138   0.008 133   0.002 333   0.006 235   0.006 202   0.003  69
DCP 7     .145      0.711    0.422 352   0.008 318   0.006   4   0.005  78   0.006 104   0.005 143   0.003  58   0.005 106   0.003 353
DCP 8     .200      0.579    0.356 357   0.007   5   0.005 286   0.010  46   0.006 113   0.005 214   0.003 283   0.004   8   0.005 171
DCP 9     .253      0.503    0.305 355   0.013  25   0.009 336   0.004 326   0.002 158   0.002 250   0.002 323   0.004 330   0.002 357
DCP10     .300      0.456    0.267 356   0.011   6   0.012 316   0.008 339   0.003 155   0.004 133   0.002 277   0.002 317   0.003   4
DCP11     .399      0.309    0.199   7   0.013  32   0.009 339   0.011 359   0.006  61   0.006 266   0.005   4   0.005 264   0.005 107
DCP12     .501      0.287    0.152  17   0.008  52   0.002 333   0.008   4   0.002 260   0.001  53   0.001 178   0.005 330   0.001 311
DCP13     .600      0.264    0.115  16   0.005  56   0.006 344   0.012 330   0.005 336   0.008 313   0.007 263   0.001 297   0.002  49
DCP14     .701      0.288    0.081  23   0.006  27   0.006  21   0.005 355   0.004  31   0.002  37   0.005 216   0.004  36   0.002  52
DCP15     .800      0.140    0.048  31   0.005  68   0.003  76   0.014  22   0.007 347   0.005 153   0.004  27   0.005 283   0.005 331
DCP16     .900     -0.074    0.023  44   0.007  68   0.006  18   0.006 330   0.008  82   0.001 136   0.006 191   0.006  11   0.001  71
DCP17     .960     -0.062    0.016 148   0.006 308   0.007 248   0.011 350   0.001 343   0.002  69   0.007   9   0.005 287   0.005 153
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0        45.67      0.172       0.399         2.84        0.0           4.94       12107.3       20

            V           Q            RN         CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
             135.0       47320.      0.64E 07   -0.024        0.870        7.94       -0.00075      0.824        0.0
            (442.3)     (988.3)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               4.939    2.837   0   0.076 357   0.065 252   0.079 102   0.028  70   0.013  67   0.014 200   0.012 175   0.010  64
CN                  0.679    0.228 357   0.005  22   0.002 314   0.016 113   0.001 241   0.001  63   0.001 280   0.001 186   0.002  89
CM                 -0.036    0.012 302   0.001 273   0.000 311   0.005 280   0.001  31   0.000 261   0.000 110   0.001 358   0.001 294

DCP 1     .010      2.735    1.582 343   0.050 270   0.010 146   0.021  98   0.006 233   0.007 331   0.010 275   0.004 222   0.006  84
DCP 2     .020      2.262    1.232 348   0.022 331   0.005 296   0.019 142   0.002 203   0.010  10   0.011 291   0.002 310   0.003   7
DCP 3     .030      2.138    1.262 348   0.021 351   0.010 313   0.010 100   0.005 169   0.010  15   0.009 264   0.009 328   0.004 236
DCP 4     .049      2.001    0.881 348   0.016 331   0.012 300   0.017 160   0.002 135   0.000  70   0.007 253   0.007 357   0.003 113
DCP 5     .074      1.773    0.702 349   0.013 352   0.010 305   0.014 159   0.001  73   0.003 326   0.002   3   0.004 332   0.003  82
DCP 6     .099      1.612    0.576 351   0.012  18   0.005 311   0.018 178   0.002 138   0.002 192   0.005  87   0.005 348   0.006  22
DCP 7     .145      1.187    0.451 351   0.014  20   0.006 310   0.011 161   0.001 307   0.001 151   0.003 236   0.003 277   0.001  45
DCP 8     .200      0.971    0.350 358   0.006   4   0.007 348   0.015 175   0.002 336   0.006  71   0.001 288   0.002  21   0.005  27
DCP 9     .250      0.829    0.288 357   0.009  16   0.006   1   0.018  86   0.003  76   0.001  23   0.007 303   0.001 126   0.001 218
DCP10     .300      0.739    0.265 359   0.008  46   0.005 241   0.017  99   0.005 325   0.002 171   0.001 307   0.001 101   0.004  37
DCP11     .399      0.610    0.198   9   0.006  36   0.003 347   0.024 112   0.003  13   0.002 279   0.001  83   0.007 168   0.002 226
DCP12     .501      0.456    0.169  11   0.002 353   0.002 293   0.018 114   0.007 286   0.001 167   0.001 239   0.003 162   0.003 114
DCP13     .600      0.386    0.113  17   0.006  23   0.004 296   0.018  96   0.003 246   0.007  67   0.001 132   0.006 200   0.003  55
DCP14     .701      0.378    0.074  26   0.007  96   0.002 345   0.018 106   0.003 207   0.002 222   0.006 240   0.003 116   0.004 127
DCP15     .800      0.189    0.065  37   0.006 106   0.006 171   0.017 114   0.005 167   0.002 335   0.001  49   0.001 319   0.003 129
DCP16     .900     -0.063    0.018  56   0.008  18   0.006 158   0.022  96   0.004 215   0.003 272   0.003 272   0.003 213   0.006 123
DCP17     .969     -0.064    0.010 201   0.007 188   0.001 266   0.020  93   0.006 176   0.005  77   0.006 335   0.003 186   0.004  19
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                0.0        45.67       0.176       0.396       2.83        0.0          7.40       12107.4      20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDP         EXT DAMP
               133.6       46578.      0.63E 07   -0.016       1.082       10.27      -0.00105     1.147       0.0
              (438.2)     (972.8)
                                                              HARMONIC ANALYSIS
DATA
TYPE     K/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.396     2.830   0   0.077   1   0.056 264   0.027  60   0.029  65   0.013  58   0.013 308   0.003 156   0.013  67
CN                 0.877     0.711   4   0.016   9   0.007 274   0.013 357   0.001 337   0.001 191   0.001 317   0.002 106   0.002 110
CM                 0.002     0.018 332   0.002 188   0.002 330   0.005 164   0.000 231   0.000 359   0.001 297   0.003 318   0.006 330

DCP 1    .010      4.677     1.982 344   0.081 274   0.142 310   0.073 214   0.016 292   0.028 177   0.011 117   0.008 126   0.036  68
DCP 2    .020      3.553     1.260 351   0.135 278   0.165 166   0.141  65   0.056 325   0.021  13   0.035 303   0.022 219   0.035 142
DCP 3    .030      3.196     0.932 350   0.056  38   0.036 324   0.016  70   0.015 288   0.011 253   0.010 133   0.022 128   0.036  44
DCP 4    .049      2.901     0.782 351   0.066  39   0.036 325   0.006 357   0.010 196   0.005 172   0.036 211   0.028 117   0.038  44
DCP 5    .074      2.500     0.662 352   0.039  30   0.015 318   0.031  84   0.006 212   0.002 156   0.033 215   0.025 153   0.031  23
DCP 6    .099      2.209     0.531 356   0.033  27   0.011 325   0.005  73   0.006 123   0.003 188   0.002  31   0.006 176   0.022  97
DCP 7    .145      1.651     0.409 355   0.022   9   0.026 263   0.006  65   0.003 168   0.036 263   0.032 227   0.036 137   0.037  53
DCP 8    .200      1.338     0.327   2   0.015  60   0.035 295   0.007 113   0.004 325   0.002  66   0.005 225   0.036 120   0.033 190
DCP 9    .250      1.137     0.275   2   0.016   6   0.005 336   0.017 332   0.001 263   0.002  82   0.003 181   0.008  36   0.036 122
DCP10    .300      0.900     0.225   4   0.015 349   0.036 153   0.014 327   0.001 281   0.036 165   0.036 238   0.002  44   0.033  72
DCP11    .399      0.816     0.187  15   0.016  12   0.035 159   0.020   4   0.000  82   0.036 251   0.006   2   0.007 147   0.031 110
DCP12    .501      0.629     0.142  21   0.012  17   0.033  98   0.015 359   0.002  95   0.001 293   0.032 227   0.002 351   0.031  68
DCP13    .600      0.494     0.107  32   0.016  20   0.033 163   0.017 351   0.003  86   0.006 216   0.033  39   0.031 221   0.036 356
DCP14    .701      0.445     0.070  56   0.018  22   0.026 127   0.015 339   0.006 330   0.031  32   0.001  86   0.003  53   0.005 218
DCP15    .800      0.225     0.055  72   0.013   4   0.036 154   0.018 357   0.002 330   0.006  93   0.001 357   0.001 168   0.037 156
DCP16    .900     -0.251     0.032  83   0.036 344   0.012 235   0.020 336   0.033 281   0.033 170   0.026  26   0.036  30   0.002  35
DCP17    .965     -0.365     0.008 116   0.009 308   0.017 176   0.016   7   0.005 126   0.005 332   0.009   3   0.032  36   0.036 104
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                0.0        45.60       0.175       0.394       2.79        0.0          9.89       12107.5      20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDP         EXT DAMP
               132.9       46214.      0.63E 07   -0.015       1.297       12.20      -0.00120     1.310       0.0
              (435.9)     (965.2)
                                                              HARMONIC ANALYSIS
DATA
TYPE     K/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.892     2.793   0   0.118  17   0.110 258   0.031 181   0.041  62   0.021  56   0.010 235   0.005 252   0.008  28
CN                 0.998     0.736  46   0.066 322   0.009 153   0.011 280   0.003 170   0.001 210   0.002 206   0.003 359   0.002  23
CM                 0.007     0.018 259   0.016  59   0.009 279   0.001  74   0.002 209   0.001  84   0.000  98   0.001 145   0.001 288

DCP 1    .010      5.431     0.676  13   0.692  91   0.193   8   0.080  98   0.104  34   0.063 309   0.049 212   0.026 182   0.020 185
DCP 2    .020      4.270     0.880  30   0.347  28   0.232   1   0.190 319   0.052 357   0.125 340   0.083 294   0.033 263   0.006 279
DCP 3    .030      3.809     0.644  31   0.333  40   0.230 343   0.200 295   0.133 245   0.073 211   0.046 202   0.037 179   0.015 189
DCP 4    .049      3.369     0.569  40   0.301  15   0.167 288   0.059 242   0.041 241   0.050 206   0.033 161   0.020 154   0.017 122
DCP 5    .074      2.816     0.430  49   0.263  16   0.100 274   0.011 206   0.029 255   0.036 185   0.027 130   0.016 118   0.020  50
DCP 6    .099      2.490     0.448  46   0.229 354   0.105 265   0.006 170   0.042 228   0.051 135   0.021  46   0.007  83   0.020  28
DCP 7    .149      1.916     0.441  38   0.202 327   0.083 216   0.013 346   0.045 199   0.037 112   0.015 107   0.037  63   0.039 338
DCP 8    .200      1.562     0.388  40   0.154 322   0.059 292   0.023 306   0.052 186   0.037  86   0.005   1   0.009  73   0.019 322
DCP 9    .250      1.323     0.355  37   0.127 302   0.037 177   0.021 232   0.035 122   0.028  19   0.012 296   0.015 343   0.011 233
DCP10    .300      1.150     0.308  39   0.113 298   0.040 176   0.015 177   0.024  79   0.020 333   0.008 197   0.012 302   0.006 187
DCP11    .395      0.926     0.257  50   0.090 299   0.031 151   0.009 256   0.016  91   0.012 356   0.005 273   0.029 316   0.005 209
DCP12    .501      0.687     0.215  53   0.071 286   0.041 123   0.007 346   0.010  41   0.008 292   0.004 254   0.005 280   0.004 123
DCP13    .600      0.527     0.178  65   0.059 280   0.036  99   0.010 316   0.011  14   0.017 250   0.008 146   0.009   7   0.002 245
DCP14    .701      0.434     0.153  86   0.042 276   0.036  88   0.017 273   0.008  29   0.009 221   0.006  12   0.007 292   0.006 120
DCP15    .800      0.229     0.101  76   0.046 267   0.036  78   0.008 269   0.005  23   0.035 255   0.007 257   0.003  11   0.006  61
DCP16    .900     -0.015     0.071  23   0.043 219   0.018  59   0.010 283   0.008 309   0.004 143   0.001 176   0.005 244   0.006  86
DCP17    .969     -0.052     0.037 359   0.018 219   0.005   7   0.010 142   0.008 271   0.004 174   0.006 265   0.009  42   0.006  71
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       45.56      0.168      0.406      2.67       0.0        12.47      12109.1     20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOD         EXT DAMP
                138.1      48809.     0.64E 07  -0.094      1.338      13.95     -0.00121    1.373       0.0
               (453.2)    (1019.4)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             12.466   2.669   0  0.078  58  0.168  39  0.062 112  0.008  37  0.011 142  0.011  79  0.012 161  0.017 277
CN                 1.015   0.269  78  0.038  49  0.022   0  0.004 136  0.010 227  0.009 292  0.006  96  0.001 281  0.002 182
CM                -0.015   0.069 232  0.016  94  0.012 105  0.007  30  0.005  38  0.003 347  0.003 347  0.003 162  0.003 167

DCP 1    .010      5.767   1.051 169  0.402 100  0.159 300  0.055 284  0.025 265  0.070 335  0.082 290  0.026 305  0.029 325
DCP 2    .020      4.101   0.828 172  0.687 115  0.033 169  0.057 276  0.071 259  0.047 295  0.063 300  0.025 320  0.038 336
DCP 3    .030      3.489   0.602 150  0.515 190  0.317 118  0.157 120  0.097 173  0.086 193  0.053 219  0.036 227  0.026 270
DCP 4    .040      3.208   0.686 172  0.365  75  0.070  67  0.085 109  0.061 125  0.026 147  0.017 211  0.032 236  0.032 236
DCP 5    .076      2.669   0.656 121  0.283  98  0.053  41  0.071  85  0.037  82  0.011  99  0.007 189  0.026 290  0.019 207
DCP 6    .099      2.968   0.621 116  0.296  48  0.093 137  0.103  67  0.040  76  0.027  96  0.019  98  0.036 160  0.032 136
DCP 7    .145      1.875   0.563  57  0.144  37  0.121  76  0.083  33  0.023  47  0.015 119  0.032 112  0.023 110  0.021 113
DCP 8    .200      1.469   0.655  87  0.102  34  0.138  51  0.051  12  0.010 346  0.039 215  0.013 169  0.036 140  0.028 308
DCP 9    .250      1.348   0.676  77  0.080  95  0.119  75  0.029 347  0.036 343  0.076 337  0.030 347  0.013 291  0.009  48
DCP10    .300      1.159   0.380  67  0.356  63  0.090 146  0.029 339  0.007 266  0.062 266  0.016 332  0.023 116  0.017 [illegible]
DCP11    .399      0.889   0.356  65  0.048   5  0.085 358  0.016 293  0.038 285  0.012 282  0.007 220  0.008  13  0.008 313
DCP12    .501      0.766   0.298  56  0.030 321  0.068 333  0.026 342  0.032 257  0.021 226  0.023 151  0.038  61  0.036 276
DCP13    .600      0.613   0.252  53  0.038 278  0.056 313  0.033 298  0.031 231  0.020 181  0.029 113  0.020 356  0.013 236
DCP14    .701      0.479   0.195  52  0.053 259  0.046 294  0.036 182  0.029 201  0.021 155  0.022  60  0.011 303  0.032 230
DCP15    .800      0.295   0.163  32  0.063 271  0.066 255  0.031 187  0.021 172  0.037 176  0.018  56  0.011 293  0.006  88
DCP16    .900      0.069   0.169  16  0.031 293  0.032 262  0.020 187  0.009 153  0.019 129  0.013 356  0.009 282  0.031 308
DCP17    .965     -0.008   0.065   4  0.014 330  0.018 266  0.019 203  0.010 186  0.011 190  0.007 321  0.013 277  0.004  38


                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       45.62      0.173      0.399      2.65       0.0        14.89      12109.2     20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOD         EXT DAMP
                134.6      47009.     0.63E 07  -0.141      1.625      15.45     -0.00138    1.522       0.0
               (441.6)    (981.8)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             14.895   2.651   0  0.012 141  0.091 121  0.031  41  0.032   7  0.003 133  0.022 145  0.003 178  0.017 323
CN                 1.029   0.359  78  0.075  86  0.033  57  0.019  19  0.005  12  0.005   1  0.007  67  0.008  18  0.001 190
CM                -0.041   0.069 196  0.023 187  0.016 162  0.010 159  0.002 178  0.002 153  0.001  35  0.002 184  [illegible]  8

DCP 1    .010      6.855   1.391 171  0.388 265  0.123 120  0.069  41  0.083  67  0.029  36  0.039 156  0.027 200  0.022 203
DCP 2    .020      5.017   1.155 157  0.360 179  0.091 128  0.077  52  0.059  36  0.031 126  0.016 116  0.016 120  0.020 276
DCP 3    .030      4.367   1.079 172  0.539 169  0.174 198  0.138 260  0.057 283  0.022  17  0.039  43  0.028   7  0.019 112
DCP 4    .040      3.929   0.953 146  0.278 129  0.153 159  0.030 167  0.067 275  0.032  46  0.036  38  0.038  12  0.032 136
DCP 5    .076      2.419   0.777 133  0.153 127  0.137 138  0.063 165  0.012 171  0.013 136  0.023  83  0.030  62  0.012  41
DCP 6    .100      2.157   0.679 121  0.162 139  0.115 116  0.036 188  0.015 155  0.033  81  0.017  18  0.018  28  0.008  86
DCP 7    .149      1.760   0.553  38  0.187 128  0.099 137  0.067 152  0.017  79  0.015 327  0.028 307  0.028 336  0.010 337
DCP 8    .200      1.506   0.635  48  0.196 117  0.097 102  0.064 117  0.013  85  0.006 339  0.026 235  0.014 316  0.003   3
DCP 9    .250      1.353   0.398  77  0.168 135  0.073  83  0.066  68  0.017 129  0.007 325  0.039 261  0.037 148  0.019  10
DCP10    .300      1.216   0.381  66  0.153  87  0.060  59  0.036  70  0.015  61  0.013 166  0.019 130  0.009 139  0.006  57
DCP11    .355      1.068   0.360  58  0.131  79  0.066  66  0.042  65  0.018  88  0.015  99  0.003 198  0.016 121  0.035 329
DCP12    .501      0.892   0.330  47  0.116  57  0.073  26  0.056   5  0.019  26  0.015   8  0.036 161  0.011  57  0.017 220
DCP13    .600      0.676   0.295  41  0.090  36  0.064  10  0.068   1  0.019 351  0.026  18  0.009 336  0.021  23  0.008 208
DCP14    .731      0.550   0.272  30  0.085   1  0.044 338  0.036 323  0.014 313  0.013 311  0.032 293  0.017 350  0.007 170
DCP15    .800      0.392   0.261  71  0.077 354  0.042 332  0.038 332  0.018 290  0.010 256  0.036 301  0.013 345  0.073 165
DCP16    .900      0.149   0.146  22  0.066 351  0.046 319  0.034 306  0.013 241  0.008 290  0.006 166  0.010 277  0.011  60
DCP17    .965      0.028   0.053  27  0.027   5  0.023 313  0.020 336  0.003 276  0.039  13  0.038 172  0.036  33  0.012 223
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ      K            MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                  0.0         45.65         0.174        0.395        2.67        0.0         17.36        12109.3       20

                V            Q             RN           CM(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDP          EXT DAMP
                 133.6        46477.        0.63E 07    -0.139        1.268       17.63      -0.00239      2.415        0.0
                (438.4)      (970.7)
                                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              17.366    2.673   0    0.044  11    0.061 197    0.065 193    0.012  18    0.007   8    0.015 176    0.009 107    0.030 225
CN                  1.021    0.306  83    0.029  58    0.011 115    0.007  65    0.007 239    0.001 331    0.003  76    0.003  16    0.002 133
CM                 -0.076    0.052 217    0.011 192    0.031 268    0.002 258    0.003  63    0.000 247    0.002 270    0.001 314    0.001 190

DCP 1    .010       4.148    0.997 188    0.116 286    0.105  94    0.023  14    0.010  14    0.050  67    0.009  96    0.025 156    0.034 303
DCP 2    .020       3.335    0.960 173    0.038 105    0.066  69    0.060  41    0.039   5    0.037  41    0.023  69    0.012  30    0.037 189
DCP 3    .030       2.928    0.967 170    0.062 347    0.016 172    0.036  32    0.020 122    0.015 299    0.019 118    0.006 260    0.030 177
DCP 4    .049       2.369    0.677 150    0.059 186    0.047 177    0.020  15    0.013 299    0.037  67    0.008 231    0.020 222    0.022 211
DCP 5    .074       1.963    0.635 123    0.048 186    0.038  50    0.011 257    0.007 331    0.012   0    0.007 235    0.005 241    0.014 203
DCP 6    .099       1.811    0.368 132    0.067 166    0.013 129    0.017 266    0.017 313    0.029 351    0.032 318    0.006 127    0.038 118
DCP 7    .149       1.611    0.302  81    0.068 118    0.035 123    0.019 175    0.030 225    0.018 273    0.009 323    0.003 329    0.016  73
DCP 8    .200       1.473    0.283  84    0.063 126    0.038 123    0.009 296    0.014 358    0.036  10    0.007 349    0.029  65    0.007 176
DCP 9    .250       1.378    0.266  85    0.060 131    0.012  97    0.010 162    0.014 107    0.011 190    0.015 156    0.012  19    0.016 319
DCP10    .300       1.238    0.303  76    0.076  97    0.018 198    0.034  25    0.024 153    0.032 215    0.014 360    0.029  65    0.030 206
DCP11    .399       1.119    0.276  73    0.071  76    0.019 127    0.013  97    0.012 219    0.007 263    0.035 296    0.023 311    0.016 138
DCP12    .501       0.977    0.278  63    0.062  34    0.017  63    0.015  68    0.009 278    0.011  95    0.016 135    0.017 276    0.018 120
DCP13    .600       0.765    0.25   56    0.055  17    0.036  35    0.014 139    0.036 239    0.015  63    0.017  86    0.039 253    0.014  65
DCP14    .701       0.659    0.22   44    0.047 358    0.006 278    0.006  40    0.016 271    0.036 337    0.008  50    0.003 189    0.017 350
DCP15    .800       0.507    0.186  40    0.038 357    0.037 116    0.012  77    0.019 261    0.001  23    0.011 166    0.017 139    0.011 303
DCP16    .900       0.215    0.135  47    0.032 353    0.035  83    0.010  17    0.014 292    0.005 291    0.007  41    0.013  58    0.005 228
DCP17    .965       0.053    0.058  67    0.007  17    0.032  97    0.008  99    0.003 173    0.005  53    0.001 353    0.006 129    0.010  38


                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ      K            MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                  0.0         45.59         0.175        0.393        2.71        0.0         15.87        12109.4       20

                V            Q             RN           CM(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDP          EXT DAMP
                 132.6        45927.        0.63E 07    -0.156        1.255       15.67      -0.00309      3.357        0.0
                (435.2)      (959.2)
                                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              15.871    2.709   0    0.069   6    0.048 200    0.038 161    0.027  30    0.010  24    0.011 186    0.014 129    0.005 343
CN                  1.012    0.208  84    0.009  69    0.010 156    0.013 227    0.009  88    0.012 116    0.006  99    0.007 176    0.001 160
CM                 -0.096    0.052 233    0.008 205    0.003 215    0.002  47    0.003 254    0.004 289    0.001 273    0.002 333    0.001  54

DCP 1    .010       3.376    0.882 191    0.086  74    0.025  66    0.061 176    0.026 242    0.015 341    0.016   3    0.017 223    0.030 175
DCP 2    .020       2.836    0.801 171    0.095  63    0.071 239    0.045 159    0.012 302    0.007  40    0.009 288    0.029 224    0.031 211
DCP 3    .030       2.489    0.747 149    0.138 266    0.035  73    0.021 266    0.001 136    0.002 153    0.021   7    0.012 146    0.011 269
DCP 4    .049       2.000    0.537 138    0.075 230    0.071 198    0.062 238    0.025 242    0.018 323    0.021 356    0.011  31    0.013  89
DCP 5    .074       1.755    0.273 108    0.061 186    0.053 179    0.040 275    0.017  96    0.017 169    0.006 312    0.009 209    0.017 349
DCP 6    .099       1.693    0.242  99    0.070 186    0.030 186    0.029 211    0.013 354    0.022  89    0.009  83    0.008 313    0.006  64
DCP 7    .149       1.562    0.236  89    0.040 161    0.039 160    0.026 233    0.011 179    0.007 166    0.011 116    0.003 259    0.008 215
DCP 8    .200       1.410    0.217  91    0.032 196    0.032 272    0.020 256    0.015  86    0.013  81    0.016 127    0.007 167    0.011 180
DCP 9    .250       1.367    0.250  88    0.027 197    0.023 227    0.011 254    0.005  91    0.011 171    0.001   3    0.009 275    0.008  82
DCP10    .300       1.252    0.251  81    0.012 172    0.024 203    0.013 242    0.010  42    0.015  76    0.012 153    0.007 259    0.006  39
DCP11    .395       1.154    0.272  82    0.023  69    0.024 166    0.011 238    0.011 147    0.010 144    0.017 111    0.010 217    0.008  60
DCP12    .501       0.977    0.274  72    0.036  58    0.035 127    0.010 248    0.025  86    0.018 159    0.014 126    0.015 168    0.018  60
DCP13    .600       0.828    0.257  65    0.027  48    0.020  76    0.016 176    0.018 130    0.020 149    0.008  94    0.017 163    0.006 358
DCP14    .701       0.779    0.233  57    0.031  38    0.013  19    0.006 208    0.024  82    0.025 118    0.010  38    0.018 134    0.004 314
DCP15    .800       0.567    0.195  56    0.032  16    0.017  11    0.008 210    0.012  72    0.026 100    0.003 162    0.006 160    0.016 229
DCP16    .900       0.258    0.159  60    0.033 358    0.017   6    0.015 266    0.012   2    0.013  56    0.001 259    0.005 115    0.016 212
DCP17    .969       0.067    0.076  68    0.010   1    0.032 333    0.010 210    0.007 325    0.010  60    0.011  61    0.007 183    0.009 237
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNNEL HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0        69.30      0.252       0.407       3.15        0.0         0.98       12111.1      30

           V           Q           RN         CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TMD         EXT DAMP
           138.2       48953.      0.64E 07   -0.035       0.360       3.25       -0.00069     0.709       0.0
          (453.3)     (1022.4)
                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               0.957   3.147   0  0.136 308  0.008 191  0.022 113  0.012 216  0.028  53  0.009  92  0.006 189  0.008  87
CN                  0.112   0.222   5  0.013 331  0.004 267  0.002 217  0.002 214  0.001 129  0.002  77  0.001 326  0.001 300
CM                 -0.016   0.017 293  0.001 238  0.001 212  0.001  96  0.000 303  0.000 296  0.003 208  0.000 312  0.000 178

DCP 1     .010     -1.137   1.580 342  0.067 290  0.050 181  0.010  95  0.026 150  0.007 259  0.023 318  0.011  92  0.009 137
DCP 2     .020     -0.964   1.197 353  0.053 336  0.026 229  0.011 179  0.012 296  0.007  53  0.013  97  0.003 315  0.035 111
DCP 3     .030     -0.385   1.000 360  0.051 286  0.029 229  0.010 172  0.012 272  0.006  85  0.003 338  0.006 287  0.004 183
DCP 4     .045      0.161   0.821 351  0.037 298  0.021 231  0.004 161  0.008 263  0.003  83  0.006 308  0.003 176  0.001 313
DCP 5     .074      0.277   0.670 351  0.029 299  0.022 230  0.006  73  0.006 188  0.002 358  0.006  66  0.007 286  0.006 166
DCP 6     .099      0.366   0.572 353  0.023 335  0.015 247  0.006  80  0.009 187  0.006  65  0.001   6  0.006 293  0.007  37
DCP 7     .145      0.267   0.420 356  0.013 346  0.011 241  0.006 198  0.007 230  0.001 353  0.006  57  0.006 303  0.006 190
DCP 8     .200      0.189   0.363   5  0.019 330  0.011 268  0.007 270  0.013 150  0.006  60  0.006  56  0.006 288  0.006 253
DCP 9     .250      0.181   0.301   7  0.018 333  0.012 273  0.006 158  0.003 110  0.006 135  0.003 136  0.004 356  0.002 184
DCP10     .300      0.185   0.251   6  0.013 326  0.006 238  0.003 216  0.005 320  0.006 169  0.003  65  0.009 278  0.003 319
DCP11     .400      0.163   0.207  29  0.012 343  0.003 342  0.006 136  0.005 266  0.006 157  0.006  81  0.003 330  0.008 326
DCP12     .501      0.120   0.157  36  0.008 347  0.006 274  0.006 336  0.009 338  0.006 238  0.002 133  0.032 315  0.003 303
DCP13     .600      0.130   0.118  36  0.000 357  0.006 319  0.002 208  0.001 170  0.005 176  0.006 129  0.006 331  0.005 270
DCP14     .701      0.202   0.083  61  0.006  31  0.003  31  0.005 268  0.007 151  0.003 217  0.001 250  0.008 161  0.006  87
DCP15     .800      0.086   0.067  58  0.008  33  0.006  13  0.001  33  0.005 115  0.003 334  0.002 343  0.003 100  0.003  22
DCP16     .900     -0.003   0.026  77  0.003  18  0.008  35  0.013 230  0.000 237  0.007  57  0.005 135  0.006 217  0.006 167
DCP17     .965     -0.067   0.019 183  0.008 156  0.006 157  0.003  70  0.010 118  0.001 311  0.001 350  0.006   1  0.003 350

                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNNEL HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0        68.52      0.256       0.403       3.14        0.0         2.48       12111.2      29

           V           Q           RN         CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TMD         EXT DAMP
           136.4       48144.      0.66E 07   -0.028       0.595       5.73       -0.00065     0.756       0.0
          (447.5)     (1005.5)
                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               2.486   3.141   0  0.127 296  0.072 203  0.014 120  0.011  59  0.030  85  0.005  59  0.035 189  0.007 327
CN                  0.367   0.227   4  0.011 323  0.001 355  0.002 282  0.001 197  0.002 156  0.001 123  0.001 293  0.001 185
CM                 -0.011   0.017 292  0.002 216  0.001 225  0.001 121  0.001  68  0.001  71  0.000 330  0.000  56  0.000   0

DCP 1     .010      0.765   1.460 344  0.088 285  0.072 250  0.028 135  0.008  26  0.001  11  0.002 145  0.008  56  0.002 355
DCP 2     .020      0.926   1.223 350  0.050 293  0.009 225  0.010 187  0.009 100  0.007  95  0.003 319  0.003  67  0.005 151
DCP 3     .030      1.009   1.066 349  0.043 287  0.011 203  0.005 158  0.004  98  0.006  72  0.006 357  0.001 237  0.005 125
DCP 4     .049      1.058   0.861 350  0.036 296  0.007 185  0.007 158  0.006 159  0.005  53  0.006  11  0.007 208  0.001 166
DCP 5     .074      1.012   0.691 350  0.032 290  0.006 260  0.002  55  0.009 132  0.006  98  0.002 277  0.006   8  0.003 133
DCP 6     .099      0.876   0.580 353  0.023 317  0.012 299  0.007 216  0.012 108  0.002  51  0.001 300  0.011 301  0.007 288
DCP 7     .149      0.706   0.425 356  0.022 283  0.006 140  0.003 200  0.008  93  0.010  96  0.003  67  0.008  63  0.003 267
DCP 8     .200      0.569   0.358   4  0.017 330  0.005 330  0.006 356  0.003  26  0.003  99  0.001 271  0.006 336  0.006 231
DCP 9     .250      0.523   0.300   2  0.012 313  0.003   6  0.006 255  0.003 220  0.003  86  0.006 156  0.004 352  0.007 136
DCP10     .300      0.461   0.252   5  0.015 321  0.006 151  0.001 196  0.002  86  0.002 176  0.001 316  0.001 168  0.004 117
DCP11     .399      0.385   0.208  20  0.010 343  0.003 289  0.006 292  0.005 288  0.002 125  0.002 186  0.003 213  0.000 152
DCP12     .501      0.285   0.159  25  0.011 345  0.006   2  0.006 319  0.003 165  0.006 183  0.006 106  0.003 261  0.002   0
DCP13     .600      0.262   0.129  33  0.007   6  0.006   8  0.002 267  0.005 243  0.006 273  0.005 126  0.001  73  0.005 219
DCP14     .701      0.201   0.088  41  0.007 341  0.003 111  0.007 316  0.006 231  0.006 157  0.013  96  0.006 263  0.007 160
DCP15     .800      0.138   0.060  53  0.010  26  0.006 314  0.005 301  0.006 271  0.002 276  0.006 290  0.003 286  0.002 267
DCP16     .900     -0.083   0.022  77  0.007  35  0.012  71  0.003 300  0.004 199  0.001 205  0.005 162  0.001 102  0.001  91
DCP17     .965     -0.262   0.006 193  0.005 275  0.001 214  0.005 192  0.002 328  0.005 295  0.002 351  0.006 160  0.003 190
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
               0.0           69.56         0.262         0.399         3.10          0.0           4.97          12111.3       20

              V             Q             RN            CM(MIN)       CN(MAX)       ALPHA,NMAX    AERO DAMP     TOR           EXT DAMP
               135.0         47320.        3.66E 07     -0.026         0.851         8.04         -0.00070       0.788         0.0
              (443.0)       (988.3)
                                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             4.978    3.103   0    0.136 311    0.071 214    0.008 161    0.026 127    0.023  65    0.006  17    0.034 287    0.003 283
CN                0.690    0.715   3    0.014 344    0.032 344    0.003 258    0.008 213    0.013  11    0.037 157    0.036 317    0.032 277
CM               -0.007    0.019 302    0.002 231    0.002 190    0.001  67    0.002  69    0.002 215    0.001 331    0.001 189    0.031  63

DCP 1    .010     2.950    1.614 341    0.123 256    0.056 142    0.007 321    0.013  63    0.004 327    0.010 237    0.012 136    0.004 111
DCP 2    .020     2.296    1.225 349    0.053 296    0.023 143    0.005 266    0.010 175    0.007 312    0.030 305    0.008 193    0.001 306
DCP 3    .030     2.167    1.036 349    0.061 305    0.016 227    0.001 293    0.007 102    0.009 330    0.008 266    0.001 259    0.004 161
DCP 4    .049     2.010    0.878 353    0.042 295    0.013 240    0.003 243    0.008 119    0.003  28    0.035 287    0.011 348    0.002 333
DCP 5    .074     1.778    0.792 351    0.026 308    0.010 258    0.003 238    0.006 126    0.003  42    0.036 332    0.006 120    0.002 260
DCP 6    .099     1.615    0.572 354    0.032 317    0.006 197    0.006 263    0.005 170    0.003  96    0.006 343    0.003 354    0.007 338
DCP 7    .149     1.184    0.461 356    0.021 337    0.007 260    0.006 278    0.005 185    0.004  62    0.002  11    0.003 333    0.039 181
DCP 8    .200     0.963    0.365   4    0.019 336    0.008 253    0.002 166    0.002 263    0.034 236    0.005 343    0.002  80    0.002 213
DCP 9    .250     0.892    0.288   3    0.022 335    0.006 284    0.002 227    0.010 232    0.006  41    0.007 345    0.006 344    0.005 338
DCP10    .300     0.736    0.276   5    0.016 337    0.033 255    0.005 268    0.032 318    0.002 251    0.036 323    0.035 255    0.031 261
DCP11    .399     0.676    0.139 350    0.049  26    0.017  66    0.011   3    0.076 192    0.118 352    0.001 169    0.029 290    0.023 336
DCP12    .501     0.459    0.154  31    0.013  14    0.006 292    0.001  59    0.007 227    0.007  38    0.003 129    0.033 322    0.004 113
DCP13    .600     0.376    0.161  43    0.007 252    0.017  18    0.013 177    0.024 310    0.028 195    0.021 276    0.018  70    0.021 236
DCP14    .701     0.370    0.083  69    0.008 353    0.007 355    0.010 279    0.001 328    0.033 193    0.008  73    0.035  16    0.010 167
DCP15    .800     0.187    0.060  68    0.007  45    0.006 338    0.005 210    0.002 316    0.004  83    0.038 352    0.006 330    0.037 329
DCP16    .900    -0.364    0.029 101    0.006  96    0.035 276    0.007 292    0.003 217    0.036  64    0.006 146    0.033  66    0.002 167
DCP17    .969    -0.068    0.015 151    0.003 326    0.002 153    0.002  77    0.007 267    0.005 303    0.002 290    0.036 351    0.001 346


                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
               0.0           69.48         0.260         0.397         3.14          0.0           7.48          12111.4       20

              V             Q             RN            CM(MIN)       CN(MAX)       ALPHA,NMAX    AERO DAMP     TOR           EXT DAMP
               134.0         46846.        3.63E 07     -0.021         1.103         10.63        -0.00094       1.354         0.0
              (439.8)       (978.4)
                                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             7.483    3.137   0    0.102 315    0.130 188    0.013 151    0.022  64    0.015  56    0.012 169    0.003 230    0.037 281
CN                0.865    0.222  12    0.020 341    0.037 327    0.002 349    0.003 260    0.002  19    0.032 131    0.009 118    0.001 331
CM                0.001    0.026 293    0.003 185    0.031  11    0.001 128    0.001  59    0.000 348    0.001 315    0.000 317    0.000  78

DCP 1    .010     4.252    1.005 344    0.106 267    0.138 288    0.006 199    0.017 149    0.025 165    0.007  67    0.036 344    0.008   1
DCP 2    .020     3.578    1.369 352    0.218 270    0.192 166    0.167  63    0.045 327    0.029  26    0.056 301    0.031 317    0.005 109
DCP 3    .030     3.193    0.963 351    0.032 337    0.015 261    0.021  66    0.026 307    0.023 232    0.015 116    0.005  62    0.035   5
DCP 4    .049     2.802    0.790 353    0.051  15    0.021 287    0.009 170    0.006  68    0.033 213    0.008 152    0.012 350    0.039 262
DCP 5    .074     2.401    0.652 355    0.030 350    0.010 268    0.007 188    0.006 178    0.003  73    0.032 144    0.004  28    0.006 278
DCP 6    .099     2.159    0.542 358    0.036 347    0.009 225    0.002  33    0.003 314    0.036 356    0.033  69    0.032  25    0.009  67
DCP 7    .149     1.639    0.437   2    0.026 343    0.007 269    0.007 219    0.002  95    0.005  17    0.036  30    0.007  78    0.003  16
DCP 8    .200     1.229    0.363  11    0.020 337    0.006 185    0.003 167    0.005 196    0.031 166    0.009 208    0.035 175    0.032  81
DCP 9    .250     1.136    0.282   8    0.015 331    0.038 239    0.008 259    0.033 213    0.006   2    0.003 161    0.032 169    0.003 348
DCP10    .300     0.887    0.265  13    0.017 331    0.005 239    0.006  66    0.001 230    0.035 341    0.037  75    0.003 176    0.001 207
DCP11    .355     0.813    0.204  29    0.022 351    0.036 226    0.036  63    0.005 249    0.003 158    0.033  85    0.001 162    0.036  58
DCP12    .501     0.611    0.165  35    0.01  354    0.006 256    0.032 288    0.006 294    0.006 340    0.003 206    0.032 183    0.032 237
DCP13    .600     0.695    0.127  48    0.017   8    0.009 256    0.005 339    0.006 283    0.008 180    0.001  75    0.001 295    0.001   9
DCP14    .701     0.666    0.133  66    0.026 355    0.007 198    0.002   8    0.008 263    0.006  13    0.008 170    0.036 253    0.036 331
DCP15    .800     0.722    0.081  78    0.023 346    0.005 213    0.008 311    0.003 177    0.036  23    0.007  86    0.037  93    0.006 179
DCP16    .900    -0.096    0.069  78    0.005 322    0.005 133    0.008 308    0.002 251    0.006 118    0.013 162    0.036 336    0.006 267
DCP17    .965    -0.069    0.017  73    0.007   8    0.031  23    0.006 237    0.003  88    0.032 203    0.035  18    0.033 162    0.033 113
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

          TUNNEL HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0          68.91        0.262        0.396        3.07         0.0          9.96        12111.5        20

          V             Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDB          EXT DAMP
                                      3.69E 07    -0.019        1.319        12.66       -0.00091      1.096        0.0
           133.2        46315.
          (437.1)       (967.3)                            HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.960    3.072   0   0.196 332   0.078 174   0.027 120   0.009 100   0.017  75   0.003 117   0.006  96   0.010 301
CN                 0.673    0.318  96   0.065 268   0.009  47   0.008 283   0.007 229   0.006 176   0.004  98   0.006 331   0.001  35
CM                 0.006    0.029 248   0.018  11   0.036 216   0.002 213   0.002  62   0.001 290   0.001 266   0.001 116   0.000 222

DCP 1    .010      4.485    0.926  12   0.676  61   0.176 330   0.184  56   0.125 318   0.051 169   0.013 286   0.038 181   0.054  66
DCP 2    .020      4.178    1.003  26   0.356  10   0.130 332   0.152 321   0.092 305   0.111 289   0.075 256   0.050 267   0.038 213
DCP 3    .030      3.679    0.782  31   0.436  26   0.270 304   0.155 251   0.106 215   0.081 191   0.062 153   0.028 132   0.046 131
DCP 4    .040      3.365    0.809  27   0.260 345   0.106 270   0.026 282   0.075 227   0.068 160   0.033 143   0.045 110   0.036  53
DCP 5    .056      2.931    0.678  33   0.209 329   0.091 236   0.029 316   0.059 107   0.038 123   0.020  97   0.028  47   0.014 331
DCP 6    .080      2.475    0.623  33   0.185 322   0.055 198   0.049 275   0.080 171   0.037  78   0.025  95   0.044  16   0.025 277
DCP 7    .140      1.880    0.563  28   0.130 291   0.021 113   0.067 267   0.071 123   0.035 158   0.005 353   0.018 160   0.022 306
DCP 8    .200      1.535    0.483  31   0.126 277   0.033 115   0.032 238   0.043 136   0.021 317   0.016 126   0.016 136   0.016 326
DCP 9    .250      1.311    0.464  27   0.130 263   0.029 148   0.032 166   0.048  42   0.028 270   0.012 288   0.013 201   0.016  83
DCP10    .300      1.146    0.406  27   0.118 251   0.041 116   0.008 131   0.020 356   0.013 213   0.011  28   0.010 253   0.016 153
DCP11    .400      0.926    0.367  38   0.103 266   0.043  93   0.008 131   0.028 352   0.020 236   0.008 108   0.006 222   0.008 153
DCP12    .501      0.679    0.307  44   0.095 226   0.035  61   0.011  16   0.027 296   0.019 155   0.007  71   0.006 350   0.038 296
DCP13    .600      0.521    0.260  46   0.067 213   0.062  44   0.010 350   0.030 239   0.021 114   0.007 315   0.032 308   0.035 238
DCP14    .701      0.420    0.213  69   0.066 198   0.131   6   0.006 225   0.013 231   0.006 116   0.006  83   0.028 323   0.006  56
DCP15    .800      0.219    0.138  55   0.056 177   0.022 353   0.016  12   0.015 203   0.005  53   0.035  96   0.008 261   0.037  62
DCP16    .900     -0.029    0.066  25   0.061 163   0.016 330   0.007 285   0.017  56   0.006   6   0.006  76   0.033   6   0.031 270
DCP17    .960     -0.061    0.031   7   0.022 178   0.036 331   0.016 322   0.006 137   0.006 275   0.009 141   0.037 328   0.008  11

                    FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

          TUNNEL HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0          68.65        0.251        0.407        3.06         0.0          9.88        12113.1        20

          V             Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDB          EXT DAMP
                                      3.66E 07    -0.021        1.288        12.61       -0.00379      0.918        0.0
           138.8        49092.
          (455.4)       (1025.3)                           HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.877    3.076   9   0.335 332   0.079 186   0.011 128   0.020 136   0.019  96   0.006  76   0.011  95   0.032   2
CN                 0.669    0.300  37   0.051 277   0.011  78   0.005 298   0.007 218   0.003 143   0.003 138   0.005  28   0.031 281
CM                 0.002    0.022 248   0.019  15   0.008 273   0.001 217   0.002  83   0.001 266   0.003 338   0.001 158   0.032  70

DCP 1    .010      4.861    0.986  16   0.683  63   0.112 330   0.238  66   0.173 333   0.038 165   0.019 303   0.069 187   0.047  78
DCP 2    .020      3.988    1.006  26   0.350  15   0.132 341   0.151 320   0.101 315   0.124 296   0.077 253   0.077 345   0.029 246
DCP 3    .030      3.556    0.717  33   0.422  79   0.282 313   0.196 259   0.119 210   0.065 195   0.053 170   0.033 125   0.023 158
DCP 4    .040      3.196    0.755  31   0.286 348   0.131 261   0.010 246   0.076 237   0.056 166   0.023 165   0.038 138   0.046  96
DCP 5    .056      2.995    0.656  33   0.227 337   0.085 215   0.025 336   0.078 220   0.059 136   0.025 105   0.060  71   0.063   8
DCP 6    .100      2.605    0.690  36   0.217 325   0.071 298   0.068 281   0.080 183   0.051  88   0.016 136   0.053  65   0.048 328
DCP 7    .140      1.861    0.552  28   0.192 295   0.065 180   0.066 216   0.086 119   0.053  17   0.013   5   0.033 321   0.025 298
DCP 8    .200      1.509    0.483  31   0.130 290   0.033 166   0.066 275   0.050 111   0.026 339   0.016 113   0.029  19   0.021 287
DCP 9    .250      1.300    0.434  27   0.128 268   0.061 128   0.020 155   0.035  53   0.022 315   0.017 277   0.016 195   0.011  92
DCP10    .300      1.115    0.381  27   0.125 255   0.068 117   0.015  86   0.033 358   0.023 215   0.013  55   0.006 308   0.007 101
DCP11    .400      0.907    0.327  38   0.116 256   0.068 136   0.020  68   0.023 347   0.013 223   0.007   3   0.016 310   0.015  73
DCP12    .501      0.677    0.279  62   0.085 223   0.067  63   0.016 344   0.022 282   0.017 187   0.007  88   0.012  78   0.013 316
DCP13    .600      0.533    0.225  53   0.066 216   0.038  65   0.006 132   0.017 266   0.008 167   0.006 171   0.015  22   0.012 231
DCP14    .701      0.425    0.193  68   0.066 200   0.061  19   0.036 215   0.013 253   0.009  76   0.013 202   0.036 336   0.039 176
DCP15    .800      0.235    0.136  58   0.069 189   0.031  19   0.010  18   0.019 216   0.039  69   0.006 129   0.036 308   0.008 183
DCP16    .900     -0.027    0.062  76   0.066 163   0.016   2   0.016 322   0.017 180   0.006 108   0.037 303   0.039 348   0.033 202
DCP17    .960     -0.068    0.021 356   0.019 176   0.036   2   0.036 352   0.001 126   0.003  18   0.032 163   0.002 343   0.036 206
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                              FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         68.50       0.256      0.402       2.94        0.0         12.39       12113.2      20

                  V           Q           RN         CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                   136.2       48038.      0.64E 07  -0.152       1.512       15.53       0.00021    -0.236        0.0
                  (447.0)     (1003.3)                          HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               12.392    2.942   0   0.292 352   0.116 163   0.033 137   0.010  17   0.018  43   0.005 115   0.008 189   0.005 130
CN                   1.041    0.404  48   0.083 315   0.049 192   0.020  76   0.003 307   0.005  41   0.001 281   0.003 141   0.007  70
CM                  -0.021    0.062 181   0.033  51   0.022 341   0.009 233   0.003 156   0.002 148   0.002   0   0.002 253   0.002 175

DCP 1     .010       4.842    0.793 132   0.602  76   0.163 247   0.167 183   0.040 239   0.091 203   0.041 128   0.022 184   0.057 130
DCP 2     .020       4.016    0.973  89   0.597  56   0.066  43   0.172 164   0.154 147   0.063 181   0.083 202   0.032 197   0.023 265
DCP 3     .030       3.366    0.967 119   0.700  65   0.158  43   0.181  84   0.137  49   0.033  85   0.078  99   0.035 101   0.046 126
DCP 4     .049       3.163    0.898  90   0.478  28   0.037 337   0.080  44   0.022   8   0.049  75   0.037  11   0.026 189   0.053 125
DCP 5     .074       2.679    0.822  84   0.387  12   0.025 291   0.056 355   0.019 194   0.055  52   0.046 353   0.007  58   0.030  49
DCP 6     .099       2.424    0.803  76   0.335   2   0.026   3   0.069 334   0.012 223   0.041  28   0.035 315   0.015 145   0.043  65
DCP 7     .149       1.924    0.757  59   0.282 338   0.037 318   0.048 279   0.011  45   0.027 331   0.018 344   0.025 329   0.015 328
DCP 8     .200       1.610    0.683  56   0.215 336   0.065 313   0.060 252   0.008 284   0.028 291   0.032 254   0.006 244   0.015 267
DCP 9     .250       1.389    0.632  46   0.180 311   0.059 271   0.045 218   0.020 214   0.019 198   0.010 171   0.008 176   0.020 177
DCP10     .300       1.242    0.579  38   0.150 300   0.066 247   0.022 160   0.035 235   0.024 152   0.015  81   0.011 245   0.025 126
DCP11     .399       1.043    0.555  40   0.167 298   0.126 236   0.058 141   0.017 249   0.031 144   0.021  73   0.004 297   0.013 109
DCP12     .501       0.793    0.468  34   0.140 281   0.129 208   0.056 108   0.015 144   0.032  76   0.028 355   0.016 239   0.011 118
DCP13     .600       0.632    0.373  32   0.117 253   0.133 183   0.062  73   0.016  52   0.026  27   0.027 294   0.022 173   0.019  42
DCP14     .701       0.514    0.287  23   0.121 220   0.111 151   0.057  40   0.015 359   0.021 326   0.030 215   0.031 117   0.023   1
DCP15     .800       0.328    0.234   5   0.110 209   0.093 137   0.037  40   0.020 355   0.023 307   0.029 163   0.018  53   0.017 352
DCP16     .900       0.056    0.152 350   0.075 227   0.077 120   0.038   8   0.017 322   0.013 236   0.019 116   0.020 358   0.011 228
DCP17     .969      -0.009    0.060 346   0.034 256   0.048 143   0.025  37   0.012 293   0.013 338   0.009 188   0.008  25   0.008  12

                              FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         68.49       0.259      0.397       2.91        0.0         14.84       12113.3      20

                  V           Q           RN         CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                   134.4       46985.      0.63E 07  -0.199       1.639       17.09      -0.00049     0.548        0.0
                  (441.0)     (981.3)                           HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               14.840    2.909   0   0.163  56   0.142 197   0.019 162   0.015  72   0.011  15   0.018 189   0.010 149   0.001 344
CN                   1.084    0.409  57   0.116   0   0.037 264   0.017 252   0.015 191   0.011  24   0.004 277   0.003 268   0.004 333
CM                  -0.040    0.091 188   0.040 126   0.018  57   0.007  30   0.008 344   0.005 224   0.003 315   0.000  49   0.001 144

DCP 1     .010       4.342    1.322 168   0.268  86   0.089 321   0.106 327   0.060  22   0.057  17   0.037  57   0.029  34   0.015  99
DCP 2     .020       3.974    1.287 136   0.562 100   0.112 310   0.156 287   0.055  38   0.041  32   0.051  92   0.038  86   0.013 146
DCP 3     .030       3.238    1.315 148   0.468 106   0.252 191   0.157 181   0.075 265   0.051 264   0.039   3   0.029   0   0.013  59
DCP 4     .049       3.113    1.344 118   0.290  70   0.132 126   0.026 193   0.024 220   0.047 290   0.024 331   0.052   5   0.027 345
DCP 5     .074       2.669    0.920 105   0.181  45   0.121 103   0.014 243   0.039 142   0.023 299   0.076 296   0.075 308   0.012 292
DCP 6     .099       2.408    0.859  97   0.166  57   0.122  79   0.017 191   0.021  92   0.050 268   0.074 239   0.023 291   0.011 320
DCP 7     .149       1.959    0.735  73   0.126  45   0.087  25   0.019 258   0.024 197   0.025 194   0.007 274   0.028 267   0.030 265
DCP 8     .200       1.678    0.695  67   0.156  47   0.086  15   0.035  17   0.006  56   0.017  32   0.013 349   0.006 311   0.011 327
DCP 9     .250       1.443    0.628  57   0.173  30   0.090 334   0.030   1   0.025  26   0.024 329   0.010 313   0.008 278   0.017 222
DCP10     .300       1.290    0.612  51   0.198  19   0.070 309   0.037  37   0.034   7   0.031   3   0.024 323   0.031 233   0.017  96
DCP11     .399       1.104    0.573  47   0.224  15   0.102 304   0.055 333   0.055 280   0.018 159   0.029 296   0.030 198   0.020  66
DCP12     .501       0.874    0.518  37   0.218 352   0.139 272   0.056 290   0.056 236   0.027 101   0.026 261   0.027 124   0.012 358
DCP13     .600       0.697    0.469  29   0.192 326   0.107 249   0.052 246   0.065 213   0.024  85   0.034 201   0.029  79   0.007 224
DCP14     .701       0.564    0.390  18   0.174 302   0.086 220   0.044 207   0.055 159   0.025  44   0.025 134   0.021  15   0.009 317
DCP15     .800       0.406    0.328   8   0.160 290   0.073 210   0.054 185   0.051 125   0.032  10   0.019  80   0.018 307   0.004 303
DCP16     .900       0.174    0.189  10   0.110 286   0.054 202   0.030 163   0.043 118   0.023   3   0.009  63   0.021 238   0.003 345
DCP17     .969       0.016    0.072  28   0.058 298   0.029 221   0.023 194   0.012 155   0.012  28   0.015  61   0.007 300   0.009 277
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0         68.41       0.261       0.395       2.95        0.0         17.46       12113.4     20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                                     0.63E 07   -0.201       1.485       18.85      -0.00233     2.610       0.0
             133.6       46497.
            (438.4)     (971.1)                                   HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.456   2.953   0   0.010 200   0.070 220   0.014 104   0.026  33   0.011 113   0.009 188   0.008 161   0.004 340
CN                1.044   0.356  70   0.052  24   0.019  33   0.017 299   0.006 351   0.005 247   0.000 324   0.007 113   0.001 198
CM               -0.077   0.086 216   0.026 167   0.010 174   0.006  96   0.003 168   0.002  48   0.001 193   0.002 318   0.001  85

DCP 1   .010      3.317   1.316 19[illegible]  .044 341   0.132  34   0.091  67   0.054 146   0.013 173   0.010 131   0.003 254   0.013 145
DCP 2   .020      3.307   1.128 [illegible]   0.128 129   0.086 335   0.090  69   0.046 106   0.018 135   0.028 158   0.015  32   0.007 116
DCP 3   .030      2.903   1.102 154   0.052 204   0.170 314   0.060   2   0.002 316   0.029 131   0.019 226   0.014 184   0.005 106
DCP 4   .049      2.497   0.803  41   0.165 180   0.089 117   0.092   7   0.063 313   0.052 273   0.061 208   0.047 120   0.040  73
DCP 5   .074      2.163   0.585 112   0.119 197   0.060  91   0.018 208   0.020  87   0.008  17   0.012 132   0.003 152.  0.022 257
DCP 6   .099      1.982   0.554  35   0.148 169   0.021  34   0.018 272   0.017 339   0.024  58   0.030  95   0.019 129   0.007 181
DCP 7   .149      1.690   0.492  72   0.111 140   0.013 229   0.074 269   0.037 282   0.022 288   0.013  78   [illegible]  62   0.012  76
DCP 8   [illegible]   [illegible]   [illegible]   0.104 119   0.025 139   0.029 264   0.003  85   0.017 157   0.009  65   [illegible] 114   0.015 199
DCP 9   [illegible]   1.364   0.454 [illegible]   0.118  40   0.061 129   0.020 197   0.023 173   0.007 214   0.035 155   [illegible] 315   0.038  81
DCP10   [illegible]   [illegible]   0.454 [illegible]   0.127  44   0.026 [illegible]   0.009  74   0.011 169   0.005  67   0.014 311   [illegible] 341   0.024 325
DCP11   [illegible]   [illegible]   0.44[illegible]  66   0.120  41   [illegible]  45   0.022  34   0.006  30   0.007   0   0.021 276   [illegible]  55   0.016 334
DCP12   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible] 355   0.018  59   0.017 338   0.024 217   [illegible]   0.038 160
DCP13   [illegible]   [illegible]   [illegible]   [illegible]   0.034  [illegible]   0.034 304   0.017  18   0.015 253   0.003 264   [illegible]   [illegible] 231
DCP14   [illegible]   [illegible]   [illegible]   [illegible] 337   0.056 [illegible]   0.042 277   0.014   5   0.018 212   0.014  45   [illegible]   0.012 196
DCP15   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible] 260   0.022 342   0.011 222   0.039 [illegible]   [illegible]   [illegible]
DCP16   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible] 240   0.024 [illegible]   0.006 153   [illegible]   [illegible]   [illegible] 358
DCP17   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   4   [illegible]   0.008 223   [illegible]   [illegible]   [illegible]


                    [illegible]  [illegible]  OSCILLATION              AIRFOIL     NLR [illegible]

            [illegible]
                                             RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP
                                             [illegible] -0.020      [illegible]  2.70       -0.00057
             [illegible]  [illegible]
             [illegible]  [illegible]                             HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           [illegible]   [illegible]   0   0.064  10   0.053 219   [illegible] 122   0.026  49   0.012  93   0.015 190   0.013 121   0.012   2
CN                0.127   0.245 353   0.011  34   0.004 119   0.003 230   0.001 306   0.001  62   0.002 165   0.001 158   0.001   3
CM               -0.015   0.004 276   0.001  32   0.001 126   0.001 215   0.001 323   0.000  39   0.000 131   0.001 309   0.000 339

DCP 1   .010     -0.698   1.562 348   0.147  52   0.069 143   0.040 233   0.017 317   0.007  46   0.007 115   0.015 298   0.012 350
DCP 2   .020     -0.398   1.152 350   0.076  30   0.040 124   0.026 219   0.020 309   0.013  42   0.018 129   0.012 275   0.013 330
DCP 3   .030     -0.108   0.974 350   0.061  21   0.033 130   0.024 237   0.020 332   0.013  86   0.013 147   0.014 299   0.013   2
DCP 4   .049      0.188   0.801 350   0.046  15   0.028 117   0.020 208   0.015 307   0.010  74   0.011 133   0.009 273   0.011 321
DCP 5   .074      0.321   0.671 350   0.041  33   0.022 122   0.017 232   0.014 333   0.010  91   0.007 153   0.010 309   0.008  25
DCP 6   .099      0.385   0.567 351   0.036  35   0.018 125   0.015 224   0.010 329   0.010  84   0.008 155   0.009 308   0.007  32
DCP 7   .149      0.270   0.409 351   0.031  40   0.014  81   0.015 219   0.008 314   0.007  32   0.007 149   0.006 257   0.004 330
DCP 8   .200      0.214   0.342 353   0.020  46   0.012 119   0.007 216   0.007 304   0.007   5   0.007 168   0.004 259   0.004 305
DCP 9   .250      0.206   0.350 352   0.007 357   0.002  85   0.000 356   0.001 248   0.001  42   0.002 237   0.003 114   0.002 115
DCP10   .300      0.207   0.296 352   0.006  18   0.003 305   0.003 219   0.001 141   0.001 312   0.001 174   0.004 118   0.002 113
DCP11   .399      0.173   0.238 356   0.005  24   0.004 311   0.002 207   0.002 187   0.002 297   0.001 219   0.003 113   0.000 153
DCP12   .501      0.127   0.181 358   0.003  28   0.001 305   0.003 314   0.001 224   0.001 353   0.000 339   0.003 119   0.002 348
DCP13   .600      0.135   0.136   0   0.004  49   0.002 197   0.002 346   0.002 176   0.002 150   0.002 355   0.005 138   0.001  54
DCP14   .701      0.212   0.097   0   0.003  38   0.001 258   0.001  13   0.001 154   0.001 179   0.003 286   0.004 151   0.003 204
DCP15   .800      0.087   0.054   4   0.004  45   0.001 225   0.003  18   0.002  97   0.002 172   0.002 272   0.003 141   0.001 183
DCP16   .900     -0.103   0.011   7   0.001 133   0.004 359   0.001  62   0.003 153   0.001 293   0.001 168   0.004 111   0.003 123
DCP17   .969     -0.051   0.011 176   0.002 257   0.001 343   0.002 151   0.003 137   0.001  44   C.002  77   0.005 144   0.001  93
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                      FORCED  PITCHING  OSCILLATION            AIRFOIL      MLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0        23.00      0.070       0.503       2.61        0.0         2.48      12115.2      20

             V           Q           RN         CM(MIN)     CN(MAX)     ALPHA,NMAX AERO DAMP   TDP         EXT DAMP
                                      0.79E 07  -0.018       0.682        5.14     -0.00069     0.929       0.0
              167.4       72859
             (549.1)     (1521.7)                              HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              2.477   2.614   0  0.059   2  0.042 239  0.021 128  0.023  31  0.006  44  0.013 188  0.010  36  0.008  34
CN                 0.404   0.274 353  0.005 336  0.000 168  0.001 218  0.001 313  0.001  65  0.001 165  0.004  53  0.002 129
CM                -0.010   0.007 317  0.000 249  0.000 296  0.000 202  0.001 124  0.000  49  0.003 338  0.001 219  0.000 329

DCP 1    .010      1.062   1.692 349  0.037 331  0.014 205  0.008 218  0.007   0  0.005 341  0.010 126  0.007  42  0.002  49
DCP 2    .020      0.975   1.386 350  0.023 330  0.002 162  0.002 267  0.002  11  0.002  76  0.002 110  0.007  79  0.004 102
DCP 3    .030      1.089   1.217 350  0.023 307  0.002 166  0.001 270  0.001  71  0.004  43  0.001 200  0.006  80  0.005  89
DCP 4    .049      1.189   1.038 350  0.025 289  0.002 242  0.001  64  0.001 289  0.002  96  0.002 179  0.005  63  0.003 107
DCP 5    .074      1.146   0.826 350  0.018 294  0.003 286  0.002  35  0.001 179  0.001  59  0.002 127  0.004  73  0.003 117
DCP 6    .099      1.079   0.698 350  0.012 342  0.010 327  0.011 227  0.009 117  0.007  31  0.004 250  0.004  86  0.002 102
DCP 7    .149      0.782   0.505 351  0.011 289  0.002 150  0.008 208  0.001 147  0.006 194  0.002 219  0.007 108  0.003 193
DCP 8    .200      0.626   0.412 354  0.006 345  0.001 258  0.001  81  0.003 351  0.001 350  0.002  53  0.004  88  0.002 108
DCP 9    .250      0.561   0.351 352  0.005  22  0.001  82  0.003 289  0.001 259  0.001 109  0.001 255  0.004  21  0.002  73
DCP10    .300      0.512   0.293 353  0.007   9  0.000 255  0.003 173  0.002 312  0.002  13  0.001 252  0.003  15  0.003 115
DCP11    .365      0.416   0.234 357  0.005  17  0.002 162  0.001 246  0.003 323  0.001 108  0.002 130  0.004  38  0.003 143
DCP12    .501      0.313   0.180 359  0.004  12  0.002 162  0.001 244  0.003 336  0.001  77  0.002 169  0.004  52  0.003 152
DCP13    .600      0.278   0.138   1  0.002  35  0.001  10  0.002 182  0.002 217  0.001  59  0.001 121  0.004  22  0.002  57
DCP14    .701      0.213   0.093   1  0.002  15  0.003  77  0.001 158  0.001 269  0.001 170  0.003 183  0.003  85  0.001 143
DCP15    .800      0.144   0.054   5  0.002 337  0.001  50  0.001 359  0.003 299  0.002  71  0.002 123  0.005  53  0.001  82
DCP16    .900     -0.089   0.014 355  0.001 123  0.001 275  0.002 339  0.004 343  0.002 271  0.002 214  0.002  11  0.006 179
DCP17    .969     -0.065   0.010 169  0.003 289  0.004 188  0.001 143  0.001 293  0.000 350  0.001  55  0.007  47  0.001  53


                      FORCED  PITCHING  OSCILLATION            AIRFOIL      MLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0        22.97      0.070       0.497       2.63        0.0         4.98      12115.3      20

             V           Q           RN         CM(MIN)     CN(MAX)     ALPHA,NMAX AERO DAMP   TDP         EXT DAMP
                                      0.78E 07  -0.013       0.955        7.65     -0.00090     1.197       0.0
              166.5       72294.
             (546.2)     (1509.9)                              HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              4.978   2.627   0  0.065   0  0.053 218  0.028 115  0.026  41  0.013  35  0.020 183  0.012  77  0.010  23
CN                 0.687   0.267 354  0.008  14  0.002 117  0.001   4  0.001 174  0.001  37  0.001  76  0.003  50  0.001 244
CM                -0.003   0.010 325  0.002 239  0.001 180  0.000 152  0.000 125  0.000 137  0.003 298  0.001 354  0.000 203

DCP 1    .010      2.908   1.962 348  0.106 251  0.036  40  0.043 235  0.055 128  0.039   5  0.013  43  0.027 348  0.039 226
DCP 2    .020      2.579   1.680 350  0.228 259  0.135 150  0.029  31  0.044 156  0.060  40  0.025 296  0.024  17  0.040 267
DCP 3    .030      2.433   1.309 350  0.142 258  0.179 151  0.130  51  0.050 308  0.029  35  0.067 290  0.067 196  0.047  81
DCP 4    .049      2.251   0.992 350  0.086  52  0.063 325  0.031 217  0.008 329  0.032 211  0.048 105  0.053   3  0.043 258
DCP 5    .074      2.006   0.813 350  0.033  36  0.019 333  0.015 228  0.010 140  0.007  33  0.006 281  0.012 123  0.006  48
DCP 6    .099      1.788   0.660 351  0.030  35  0.002  53  0.005 215  0.005 131  0.002 144  0.004  58  0.002 136  0.005  45
DCP 7    .149      1.296   0.490 352  0.026  40  0.004 102  0.004 220  0.002 241  0.002  38  0.001  70  0.001  46  0.002  38
DCP 8    .200      1.046   0.386 358  0.013  31  0.002 153  0.001 346  0.002 235  0.001 153  0.001 344  0.003  58  0.003  60
DCP 9    .250      0.917   0.329 354  0.013  29  0.001 327  0.002  16  0.002  64  0.001  32  0.002 111  0.003  70  0.002 107
DCP10    .300      0.830   0.272 356  0.013  32  0.001  74  0.001 271  0.002  43  0.001  95  0.001 318  0.001  32  0.002 111
DCP11    .365      0.652   0.217 359  0.011  38  0.002  64  0.002   4  0.001 132  0.003  17  0.003  22  0.004  67  0.001  33
DCP12    .501      0.493   0.167   0  0.010  43  0.003  21  0.002 267  0.002 240  0.003 237  0.003 244  0.002  58  0.001 345
DCP13    .600      0.412   0.124   2  0.009  43  0.003  16  0.002 348  0.001 138  0.001 159  0.001 135  0.006  34  0.001 306
DCP14    .701      0.402   0.070   5  0.008  43  0.001 344  0.001 342  0.002  33  0.002 288  0.003 111  0.003  93  0.001 358
DCP15    .800      0.193   0.043  14  0.007  42  0.002  56  0.001   6  0.003 285  0.001  70  0.002 117  0.003  66  0.000 349
DCP16    .900     -0.072   0.015  20  0.006  22  0.002 115  0.002  38  0.003 128  0.002  47  0.001  85  0.003  63  0.001  62
DCP17    .965     -0.073   0.007 177  0.001 246  0.001 351  0.001 301  0.002 295  0.002 323  0.002  86  0.004  75  0.002 314
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H         ALPHA.O      TEST POINT  CYCLES ANALYSED
              0.0          22.97       0.071        0.494       2.63         0.0           7.45       12115.4      20

             V            Q           RN           CN(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP    TDR         EXT DAMP
              165.4        71586.      0.78E 07    -0.007       1.183       10.09        -0.00128      1.698       0.0
             (542.5)      (1495.1)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.453    2.635   0   0.069  26   0.057 220   0.020 158   0.025  33   0.004 108   0.006 125   0.017 137   0.005 349
CN                  0.927    0.208   6   0.042   9   0.017 225   0.009  87   0.003 349   0.004  33   0.004 303   0.005 166   0.003 130
CM                  0.012    0.019 332   0.001 145   0.004 335   0.003 221   0.001 107   0.000 342   0.000 166   0.001 330   0.000 318

DCP 1     .010      4.449    1.130 349   0.508  59   0.107 311   0.011 140   0.075 108   0.034   0   0.027 110   0.012  55   0.003 336
DCP 2     .020      4.041    1.430 353   0.351  60   0.234 327   0.052  70   0.001 287   0.083  31   0.015 147   0.013  22   0.031  77
DCP 3     .030      3.847    1.452 354   0.141  44   0.228 331   0.023  65   0.109 313   0.048  39   0.049 286   0.047  15   0.021 212
DCP 4     .049      3.587    1.251 356   0.106  21   0.189 342   0.131 244   0.033 357   0.050 223   0.048 325   0.063 200   0.017 335
DCP 5     .074      2.736    0.643   8   0.202 351   0.062 232   0.071 279   0.078 185   0.007 248   0.064 179   0.046 107   0.026  53
DCP 6     .099      2.308    0.419   8   0.170   9   0.116 235   0.073 163   0.051 122   0.046  63   0.027  10   0.015 312   0.008 207
DCP 7     .149      1.712    0.324   3   0.076  20   0.037 235   0.026 151   0.022 101   0.023  46   0.018 345   0.014 285   0.012 224
DCP 8     .200      1.435    0.381   4   0.080 308   0.074 194   0.063 105   0.023  42   0.017 355   0.015 286   0.011 184   0.002 161
DCP 9     .250      1.265    0.357   0   0.083 278   0.082 166   0.049  69   0.020 355   0.014 329   0.016 271   0.017 179   0.012 115
DCP10     .300      1.079    0.259   3   0.051 296   0.053 170   0.036  66   0.019 338   0.006 296   0.009 254   0.013 153   0.006  83
DCP11     .399      0.843    0.172  11   0.026 344   0.025 175   0.025  59   0.017 313   0.007 192   0.002  66   0.006 177   0.007 128
DCP12     .501      0.621    0.102  23   0.035  32   0.008 217   0.010  44   0.008 277   0.005 173   0.004 359   0.005 191   0.003 101
DCP13     .600      0.491    0.064  45   0.038  34   0.010 246   0.005  39   0.003 269   0.003  71   0.005 332   0.005 166   0.003 127
DCP14     .701      0.425    0.053 109   0.045  44   0.012 264   0.006  86   0.003 297   0.002 345   0.001   0   0.005 158   0.001 196
DCP15     .800      0.198    0.040 112   0.025  36   0.008 214   0.006  66   0.001 319   0.004  64   0.001 302   0.004 141   0.001 218
DCP16     .900     -0.061    0.019  41   0.016 269   0.014 137   0.010   5   0.004 177   0.003  56   0.003 339   0.004 143   0.003 156
DCP17     .969     -0.074    0.010  11   0.014 258   0.011 153   0.003  50   0.001 357   0.002  59   0.003 255   0.006 113   0.002  37


                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H         ALPHA.O      TEST POINT  CYCLES ANALYSED
              0.0          22.92       0.069        0.505       2.53         0.0           9.92       12117.1      20

             V            Q           RN           CN(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP    TDR         EXT DAMP
              169.4        74080       0.79E 07    -0.024       1.205       11.66        -0.00142      1.919       0.0
             (555.8)      (1547.2)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               9.924    2.532   0   0.096  44   0.053 228   0.036 133   0.039  58   0.061  19   0.039 133   0.019 151   0.009  14
CN                  0.991    0.095  86   0.058  64   0.025  67   0.021  22   0.010 355   0.008 319   0.004 [illegible]   0.004 328   0.003 280
CM                  0.006    0.020 210   0.015  94   0.003 141   0.005 138   0.001  99   0.001  59   0.001   6   0.001 292   0.001 329

DCP 1     .010      4.425    0.400 175   0.337  90   0.070 120   0.073 103   0.058  45   0.014  29   0.014  39   0.011 189   0.015 122
DCP 2     .020      4.491    0.440 193   0.496  99   0.099  37   0.099 103   0.091  46   0.039   6   0.022  22   0.015 298   0.005 322
DCP 3     .030      4.302    0.347 190   0.543 101   0.140  78   0.084  96   0.108  39   0.069 353   0.036 349   0.045 289   0.023 253
DCP 4     .049      3.638    0.651 177   0.495  90   0.296 164   0.126 109   0.017 171   0.096  86   0.058 133   0.036 134   0.017   3
DCP 5     .074      2.691    0.376 128   0.477  96   0.179 133   0.148  98   0.147 171   0.094 246   0.042 274   0.048 294   0.061 350
DCP 6     .099      2.360    0.265 116   0.274  70   0.120  52   0.139  64   0.041  61   0.039  94   0.042 150   0.017 162   0.030 183
DCP 7     .149      1.832    0.178  78   0.138  51   0.071  34   0.049 358   0.029 349   0.076 331   0.011 261   0.007 289   0.036 245
DCP 8     .200      1.537    0.190  63   0.138  55   0.075  19   0.073  31   0.054   8   0.047   4   0.016 340   0.029  21   0.031 356
DCP 9     .250      1.379    0.220  52   0.136  37   0.073  20   0.066   2   0.055 347   0.045 333   0.027 326   0.038 340   0.033 301
DCP10     .300      1.176    0.197  48   0.083  33   0.050  26   0.057 355   0.045 331   0.032 301   0.013 267   0.018 314   0.019 265
DCP11     .399      0.940    0.148  50   0.041 359   0.023  43   0.033 344   0.023 313   0.015 262   0.037 184   0.003 301   0.005 213
DCP12     .501      0.696    0.139  63   0.026 329   0.017  75   0.028 326   0.013 276   0.008 237   0.009 197   0.006 254   0.009 192
DCP13     .600      0.530    0.079  92   0.020 293   0.011 130   0.017 290   0.003 203   0.007 200   0.012 153   0.003 119   0.004 189
DCP14     .701      0.423    0.070 116   0.025 266   0.030 135   0.009 276   0.005 120   0.031 256   0.039 195   0.008 114   0.006  60
DCP15     .800      0.226    0.054  57   0.033 270   0.003 315   0.010 284   0.005 105   0.002 215   0.006 146   0.003  81   0.001 252
DCP16     .900     -0.019    0.025  11   0.033 252   0.013 345   0.005 300   0.003 284   0.005 331   0.030 270   0.004 140   0.006 116
DCP17     .969     -0.040    0.045   6   0.030 293   0.030 313   0.002 319   0.007 353   0.001 251   0.005 259   0.001 356   0.002 289
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K            MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         22.91      0.070         0.500      2.46        0.0         12.45      12117.2      20

              V_          Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
              167.6       72912.      0.79E 07    -0.052      1.172       11.02       -0.00191    2.553       0.0
             (549.8)     (1522.8)
                                                       HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           12.447     2.465   0   0.067  17   0.036 218   0.010 129   0.013  17   0.060   3   0.019 175   0.011  50   0.008  65
CN               1.016     0.108 117   0.028 219   0.018 160   0.011 233   0.033 232   0.310 281   0.035 206   0.003  90   0.033  92
CM              -0.013     0.042 196   0.003 274   0.006 263   0.031 320   0.001 301   0.003  39   0.001 238   0.031 238   0.000   8

DCP 1    .010    4.205     0.671 178   0.363 255   0.061 239   0.011 335   0.009 310   0.018 322   0.063 233   0.036  74   0.015 236
DCP 2    .020    4.075     1.010 178   0.108 279   0.136 221   0.016 271   0.025 283   0.025  17   0.047 256   0.031  97   0.005 308
DCP 3    .030    3.393     1.057 181   0.085 274   0.215 230   0.057 291   0.062 245   0.070 335   0.059 265   0.026   7   0.020 283
DCP 4    .049    3.231     0.913 175   0.357 271   0.100   7   0.028 289   0.057   2   0.032  77   0.063 182   0.028 222   0.010 171
DCP 5    .074    2.519     0.600 163   0.193 248   0.025 327   0.037 295   0.024  12   0.030   0   0.017 160   0.028 181   0.035 264
DCP 6    .099    2.230     0.375 152   0.080 226   0.043 163   0.034 279   0.005  26   0.021 223   0.013 244   0.010 164   0.026  76
DCP 7    .149    1.837     0.213 133   0.050 108   0.050 129   0.039 233   0.013 191   0.016 274   0.014 228   0.008  43   0.006  86
DCP 8    .200    1.622     0.245 136   0.066 207   0.035 205   0.026 261   0.006  68   0.028 315   0.018 171   0.012 131   0.014  67
DCP 9    .250    1.495     0.218 122   0.083 162   0.073 201   0.028 219   0.015 254   0.023 344   0.037 145   0.008 290   0.019  26
DCP10    .300    1.279     0.162 134   0.056 155   0.069 188   0.038 196   0.018 233   0.025 333   0.012 272   0.033  93   0.006 100
DCP11    .399    1.024     0.141  70   0.036 148   0.039 160   0.020 184   0.025 219   0.026 258   0.015 150   0.011  41   0.001 231
DCP12    .501    0.759     0.136  52   0.015 190   0.023 126   0.015 172   0.039 166   0.017 228   0.005  43   0.005 217   0.010 172
DCP13    .600    0.571     0.128  30   0.020 234   0.022 100   0.001   6   0.009 129   0.011 232   0.008 201   0.009 170   0.009 112
DCP14    .701    0.440     0.114  33   0.022 269   0.011  57   0.005 356   0.005 124   0.009 221   0.003  97   0.011  59   0.006 358
DCP15    .800    0.275     0.125  20   0.002  26   0.015  40   0.001 296   0.006  67   0.009 196   0.003 341   0.002 228   0.003 140
DCP16    .900    0.259     0.099  13   0.009  59   0.012  98   0.007 296   0.008  62   0.005 235   0.004 331   0.030  30   0.006 244
DCP17    .969   -0.011     0.063  21   0.008 120   0.005  93   0.002 240   0.005 351   0.002 303   0.033 193   0.005  73   0.032 294

                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K            MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         22.91      0.070         0.498      2.49        0.0         14.90      12117.3      20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
              166.7       72443.      0.78E 07    -0.076      1.078       14.50       -0.00194    2.589       0.0
             (546.9)     (1513.0)
                                                       HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           14.895     2.490   0   0.064  17   0.021 217   0.033 107   0.007 106   0.003 162   0.028  23   0.021 191   0.006 127
CN               0.992     0.073  85   0.009 168   0.006 147   0.003 324   0.009  93   0.001 304   0.001 220   0.008 198   0.003 228
CM              -0.044     0.033 201   0.003 272   0.002 355   0.003 103   0.002 222   0.001  93   0.001  73   0.002 324   0.001  18

DCP 1    .010    3.518     0.427 160   0.014 302   0.042  70   0.015  93   0.012  46   0.016 302   0.003 330   0.006 290   0.020 315
DCP 2    .020    3.394     0.410 156   0.062 279   0.075  68   0.023 144   0.019 343   0.017  55   0.019  23   0.007  78   0.019 288
DCP 3    .030    3.216     0.554 172   0.114 264   0.065  41   0.059 106   0.017 276   0.028  54   0.027  29   0.036  16   0.010 183
DCP 4    .049    2.670     0.388 169   0.052 212   0.016  16   0.044 133   0.008 128   0.007 269   0.022 330   0.030 214   0.010  91
DCP 5    .074    2.196     0.195 160   0.049 226   0.014 350   0.017 127   0.012 202   0.005 265   0.013 257   0.008 209   0.018  64
DCP 6    .099    2.013     0.148 161   0.045 198   0.033 352   0.018  80   0.034 148   0.021 346   0.028 170   0.012 235   0.015  63
DCP 7    .149    1.755     0.096 144   0.031 179   0.018 327   0.015  47   0.012 148   0.009 265   0.006 203   0.022 195   0.023  25
DCP 8    .200    1.529     0.100 126   0.029 205   0.021 299   0.012  72   0.014  97   0.012  36   0.033 184   0.021 211   0.009 225
DCP 9    .250    1.471     0.121 122   0.011 106   0.023 186   0.010 349   0.018 142   0.033  31   0.036 120   0.010 247   0.015 306
DCP10    .300    1.262     0.118 107   0.008  14   0.023 178   0.005   8   0.028 116   0.008 200   0.038  59   0.014 244   0.030 291
DCP11    .399    1.071     0.132  76   0.018  92   0.026 156   0.008 326   0.017 100   0.013 151   0.011  47   0.017 216   0.014 302
DCP12    .501    0.831     0.125  68   0.010 119   0.014 152   0.017 297   0.016  30   0.002 270   0.008   9   0.008 196   0.011 227
DCP13    .600    0.652     0.125  35   0.014 121   0.012 163   0.013 292   0.008  57   0.006  73   0.007 228   0.004 165   0.006  77
DCP14    .701    0.526     0.129  25   0.009 131   0.003 132   0.013 262   0.006  79   0.005 279   0.004 268   0.005 161   0.004  52
DCP15    .800    0.369     0.119  21   0.007  89   0.005 250   0.010 284   0.009  56   0.006 271   0.005 222   0.010 125   0.002 206
DCP16    .900    0.122     0.086  20   0.008 137   0.001  12   0.002 271   0.009   8   0.004 312   0.030 235   0.011 133   0.007 183
DCP17    .969    0.017     0.036  32   0.003 305   0.003  43   0.004 217   0.005 351   0.009 318   0.007 249   0.003 179   0.003 143
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
            0.0       22.93      0.070      0.496      2.51       0.0        17.57     12117.4      20

          V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TOR         EXT DAMP
          165.9      71916.      0.785 07  -0.101      1.073      16.71     -0.00155    0.056       0.0
         (544.2)    (1502.0)
                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA           17.570   2.515   0  0.060  19  0.019 213  0.009  98  0.017  21  0.005  76  0.014  93  0.029 231  0.016 290
CN               1.006   0.266  92  0.031 301  0.038 191  0.035 178  0.003 330  0.001 111  0.004  19  0.004 210  0.002 351
CM              -0.071   0.025 202  0.002 222  0.002  66  0.000 347  0.001 225  0.001  78  0.000  53  0.003  55  0.002 107

DCP 1   .010     3.581   0.230 157  0.063 323  0.036  56  0.032 250  0.003 304  0.012 124  0.039  95  0.079  61  0.044  92
DCP 2   .020     3.160   0.266 156  0.062 132  0.069  65  0.021 253  0.016 310  0.038 106  0.009  37  0.026  64  0.025 152
DCP 3   .030     2.860   0.347 171  0.095 120  0.017 266  0.015 149  0.047  19  0.010 121  0.012  35  0.018 169  0.018  87
DCP 4   .049     2.319   0.389 158  0.068 312  0.011 220  0.036 288  0.005 265  0.036 113  0.019 339  0.019 211  0.011  91
DCP 5   .074     1.955   0.208 155  0.035 232  0.037 124  0.017 147  0.002  47  0.016 148  0.023  17  0.019 157  0.016  54
DCP 6   .099     1.817   0.170 155  0.015 251  0.065 128  0.027 101  0.013   1  0.013   4  0.016  46  0.017  88  0.019  57
DCP 7   .149     1.648   0.139 148  0.007 277  0.035 151  0.009 149  0.009 279  0.014 316  0.014  29  0.010 111  0.015 136
DCP 8   .200     1.459   0.102 128  0.011 269  0.014 193  0.006 129  0.003 192  0.011 119  0.019  40  0.007 189  0.010  69
DCP 9   .250     1.376   0.120 116  0.018 167  0.035 163  0.014 164  0.011 240  0.011  59  0.019   4  0.011  55  0.008  50
DCP10   .300     1.269   0.100 100  0.017 193  0.005 197  0.010 196  0.010 262  0.011  71  0.012  51  0.009  95  0.007 356
DCP11   .399     1.101   0.090  83  0.001  59  0.010 211  0.020 230  0.011 329  0.006 164  0.011 261  0.004  90  0.012 260
DCP12   .501     0.912   0.087  52  0.006 250  0.018 211  0.009 165  0.006  56  0.007 295  0.009 226  0.016 295  0.006 297
DCP13   .600     0.756   0.103  35  0.005 126  0.011 210  0.010 115  0.007 335  0.006 193  0.004 227  0.018 286  0.006  96
DCP14   .701     0.644   0.103  76  0.012  41  0.006 261  0.037  77  0.007  47  0.006 178  0.007  98  0.018 236  0.005 326
DCP15   .800     0.478   0.106  25  0.010  65  0.006 293  0.030 339  0.003  20  0.001 114  0.007  29  0.013 186  0.012 279
DCP16   .900     0.189   0.064  29  0.016   3  0.003 191  0.006 288  0.004 108  0.001 237  0.006 318  0.011 202  0.007 293
DCP17   .969     0.061   0.019  45  0.006 335  0.003 256  0.007 309  0.001 144  0.006 199  0.002  53  0.006 179  0.007 301
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
            0.0       45.52      0.135      0.510      2.83       0.0        -0.21     12119.1      20

          V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TOR         EXT DAMP
          171.2      75454       0.805 07  -0.027      0.377       2.96     -0.00065    0.900       0.0
         (561.6)    (1575.9)
                                                  HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA           -0.008   2.832   0  0.074 346  0.100 238  0.026  92  0.023  52  0.015  58  0.015 150  0.024 185  0.011   2
CN               0.122   0.252 353  0.005 346  0.006 282  0.004 101  0.001 321  0.001 100  0.001 131  0.003 193  0.001 265
CM              -0.016   0.010 297  0.001 341  0.001 185  0.000 258  0.000 127  0.000  77  0.000   0  0.001  29  0.000 113

DCP 1   .010    -0.861   1.766 342  0.123  32  0.038 170  0.021 148  0.011 112  0.020  75  0.002 316  0.003 252  0.001 190
DCP 2   .020    -0.399   1.304 346  0.032 338  0.017 243  0.017 113  0.002 157  0.003 123  0.002  23  0.003  66  0.004 225
DCP 3   .030    -0.116   1.298 346  0.028 298  0.015 251  0.013 113  0.004 237  0.002 147  0.002   0  0.000 284  0.004 199
DCP 4   .049     0.177   0.909 347  0.024 301  0.012 241  0.012 100  0.003 144  0.001 253  0.006  71  0.003  22  0.002   5
DCP 5   .074     0.309   0.754 347  0.017 316  0.014 266  0.009  94  0.003 210  0.001  23  0.002  73  0.002 317  0.002 141
DCP 6   .099     0.371   0.636 348  0.016 319  0.010 266  0.011 174  0.003 206  0.001  90  0.003 100  0.002  69  0.002 125
DCP 7   .145     0.262   0.459 349  0.016  14  0.016 288  0.008 128  0.001 176  0.002 182  0.004  59  0.001  38  0.002 252
DCP 8   .200     0.207   0.381 355  0.011 337  0.002 252  0.009 106  0.005  87  0.002  45  0.005  77  0.004  82  0.001 258
DCP 9   .250     0.200   0.336 352  0.007 339  0.006 283  0.003  12  0.001 279  0.001 126  0.005 138  0.004 155  0.001 170
DCP10   .300     0.188   0.278 352  0.006 319  0.006 269  0.003  68  0.000 298  0.002 100  0.004 170  0.003 119  0.003 111
DCP11   .399     0.170   0.224   1  0.006  10  0.005 296  0.004  88  0.003 346  0.004  83  0.002 202  0.004 177  0.001 189
DCP12   .501     0.129   0.169   4  0.002   6  0.005 300  0.002  88  0.004 327  0.001 116  0.002 134  0.004 170  0.003 337
DCP13   .600     0.138   0.127   8  0.001 258  0.003 327  0.002  66  0.001 109  0.002  98  0.001 193  0.005 226  0.001  50
DCP14   .701     0.212   0.090  12  0.000 281  0.002 316  0.001  16  0.001  85  0.004 289  0.002 148  0.005 229  0.002 210
DCP15   .800     0.089   0.051  20  0.003  33  0.002  18  0.004 121  0.003 324  0.002 238  0.001 244  0.007 204  0.004 311
DCP16   .900    -0.099   0.015  54  0.003 174  0.002 358  0.002  23  0.002 313  0.001 232  0.002 111  0.005 192  0.002 316
DCP17   .969    -0.048   0.013 183  0.002 109  0.001  76  0.004 165  0.005 212  0.003  77  0.002 299  0.004 239  0.003 220
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                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

             TUNED HZ   DRIVE HZ    K          MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
               0.0       45.53      0.137       0.505        2.82        0.0          2.47       12119.2       20

              V          Q           RN         CN(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
             169.3      74315.      0.79E 07   -0.024        0.646        5.37       -0.00066     0.908         0.0
            (555.5)    (1552.1)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.473    2.824   0   0.076   1   0.053 241   0.038 115   0.026  49   0.017  33   0.018 187   0.021 233   0.006  32
CN                 0.396    0.254 353   0.005 354   0.002 280   0.004 169   0.001 121   0.001 136   0.001 190   0.003 281   0.001 199
CM                -0.011    0.011 331   0.001 252   0.000  48   0.000  65   0.000  16   0.000   7   0.001  27   0.001  92   0.000 339

DCP 1   .010       0.887    1.587 341   0.344 338   0.036 277   0.012 183   0.012 326   0.002 241   0.005 128   0.010 269   0.013 271
DCP 2   .020       0.974    1.314 346   0.022 327   0.006 276   0.015 137   0.003  88   0.006  41   0.003  63   0.000  65   0.003 298
DCP 3   .030       1.069    1.155 346   0.020 302   0.006 279   0.010 128   0.001  86   0.001 120   0.003  56   0.002 296   0.002 303
DCP 4   .049       1.175    0.984 346   0.021 282   0.035 286   0.013 134   0.001 271   0.002  12   0.002  46   0.003  22   0.002 202
DCP 5   .074       1.131    0.782 347   0.015 290   0.008 291   0.010 121   0.003  28   0.001  17   0.003 105   0.003  41   0.003 305
DCP 6   .099       1.064    0.661 348   0.010 336   0.010 306   0.017 178   0.011  98   0.009   2   0.006 228   0.002 151   0.002  20
DCP 7   .149       0.770    0.473 349   0.011 304   0.003  57   0.014 162   0.002  75   0.007 126   0.002 124   0.006  89   0.004 169
DCP 8   .200       0.616    0.390 354   0.011  12   0.001 298   0.012 144   0.001 164   0.001 146   0.003 127   0.005 358   0.002 253
DCP 9   .250       0.569    0.329 352   0.008   0   0.003 312   0.004 145   0.003 291   0.003 153   0.003 166   0.008 295   0.001 137
DCP10   .300       0.490    0.276 353   0.007   9   0.003 261   0.006 175   0.002 157   0.001 175   0.003 184   0.006 268   0.001 167
DCP11   .399       0.409    0.220   1   0.005  69   0.002 307   0.004 223   0.002 162   0.001  96   0.003 257   0.005 287   0.001 241
DCP12   .501       0.309    0.166   6   0.003  36   0.003 333   0.001 262   0.001  83   0.006 166   0.003 347   0.005 256   0.003 157
DCP13   .600       0.274    0.126   9   0.006  19   0.001 316   0.003 118   0.003  28   0.002 151   0.001 347   0.005 303   0.001 236
DCP14   .701       0.308    0.085  12   0.006 353   0.002 242   0.002 216   0.003 230   0.002 138   0.006 186   0.003 224   0.001 271
DCP15   .800       0.139    0.069  22   0.006  30   0.001 264   0.003 198   0.002 147   0.003 277   0.003 177   0.006 335   0.002  53
DCP16   .900      -0.086    0.012  29   0.003  67   0.006 219   0.006 212   0.001 229   0.002  78   0.001 179   0.005 209   0.003 167
DCP17   .965      -0.062    0.011 175   0.006 162   0.002 189   0.004  25   0.000 166   0.003 233   0.036 265   0.007 307   0.002 178
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                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

             TUNED HZ   DRIVE HZ    K          MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
               0.0       45.53      0.138       0.502        2.82        0.0          4.93       12119.3       20

              V          Q           RN         CN(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
             168.2      73635.      0.79E 07   -0.019        0.92.        7.89       -0.00080     1.099         0.0
            (551.9)    (1537.9)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.934    2.824   0   0.076 355   0.068 243   0.035 110   0.031  56   0.013  29   0.009 189   0.023 113   0.003   9
CN                 0.671    0.269 356   0.008   2   0.001 342   0.001  73   0.003 116   0.002  41   0.001 315   0.005 122   0.001  86
CM                -0.006    0.015 309   0.002 219   0.000 222   0.001  89   0.000  39   0.000 309   0.001 232   0.001 300   0.000  81

DCP 1   .010       2.796    1.889 340   0.129 226   0.027 311   0.035 189   0.069  82   0.029 326   0.013 137   0.024 308   0.018 166
DCP 2   .020       2.506    1.601 346   0.214 248   0.119 140   0.067  41   0.050 122   0.075  15   0.042 269   0.014 324   0.067 234
DCP 3   .030       2.358    1.326 346   0.167 250   0.169 140   0.164  38   0.081 290   0.006  47   0.062 263   0.082 160   0.077  55
DCP 4   .049       2.175    0.906 347   0.127  69   0.130 313   0.082 202   0.059 106   0.027   4   0.002 149   0.015 340   0.022 279
DCP 5   .074       1.965    0.789 347   0.023  15   0.023 322   0.005 151   0.009 122   0.009  36   0.002 318   0.002  57   0.002 119
DCP 6   .099       1.746    0.634 349   0.026  18   0.007 313   0.008  87   0.007  89   0.006  92   0.006  56   0.005  76   0.005 349
DCP 7   .149       1.269    0.469 349   0.026  28   0.003 341   0.007  72   0.002 198   0.002 101   0.001 200   0.001 359   0.002  62
DCP 8   .200       1.022    0.371 356   0.013  27   0.036 329   0.009  60   0.001 146   0.001 256   0.003  52   0.001 254   0.002 192
DCP 9   .250       0.892    0.307 354   0.016  19   0.005 316   0.004 196   0.002  93   0.003 214   0.002  78   0.006  92   0.003  56
DCP10   .300       0.777    0.255 355   0.013  12   0.003 320   0.001 262   0.001  96   0.002  77   0.001 116   0.006 101   0.001  37
DCP11   .399       0.640    0.203   6   0.012  75   0.002 332   0.001  69   0.003 128   0.003  95   0.001 191   0.005 117   0.002  96
DCP12   .501       0.488    0.157   8   0.008  17   0.001  92   0.003 251   0.003 135   0.001 140   0.001  86   0.005 132   0.001 176
DCP13   .600       0.408    0.116  13   0.007  22   0.003  58   0.002 291   0.000  90   0.002 337   0.002  60   0.007 124   0.002  30
DCP14   .701       0.396    0.072  21   0.008  37   0.002  22   0.002 289   0.002 176   0.002 169   0.001  42   0.007 123   0.002 262
DCP15   .800       0.189    0.064  38   0.006  20   0.001  22   0.003 244   0.002 151   0.003  93   0.002 335   0.006 122   0.003 194
DCP16   .900      -0.069    0.015  55   0.006   1   0.006 161   0.001  39   0.000  20   0.006  63   0.002  19   0.006 105   0.001  21
DCP17   .969      -0.072    0.012 181   0.005 297   0.036   8   0.002 337   0.001  66   0.002 330   0.002  46   0.006 148   0.002   2
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0         45.56        0.138        0.501        2.93         0.0          7.45       12119.4        20

          V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
                                     0.79E 07    -0.211        1.159        10.20       -0.00109     1.487        0.0
           167.5        73199.
          (549.4)      (1528.8)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.446    2.830   0    0.093  10    0.089 256    0.015 308    0.037  61    0.013  60    0.012 259    0.005 198    0.006  29
CN                  0.896    0.728  13    0.037 318    0.014 161    0.012 355    0.036 270    0.006 256    0.006 173    0.003 160    0.032  14
CM                  0.019    0.022 312    0.006  75    0.006 293    0.006 157    0.031  19    0.003 165    0.003 266    0.031  52    0.003  63

DCP 1     .010      4.171    1.193 349    0.426  41    0.151 279    0.098  77    0.060  33    0.047 344    0.007  30    0.038 152    0.033  68
DCP 2     .020      3.867    1.464 348    0.208  41    0.237 318    0.078 139    0.086 343    0.070  36    0.026 268    0.061  38    0.015  61
DCP 3     .033      3.680    1.475 356    0.066 320    0.226 335    0.055 239    0.130 330    0.017 295    0.005 300    0.032  15    0.073 291
DCP 4     .049      3.316    1.063   2    0.214  12    0.253 320    0.226 227    0.007  85    0.136 261    0.066 116    0.077 238    0.063 126
DCP 5     .076      2.658    0.697  13    0.273 342    0.138 266    0.067 260    0.091 196    0.061 162    0.065 129    0.082  89    0.057  50
DCP 6     .099      2.259    0.698   7    0.176 339    0.138 227    0.071 127    0.033  81    0.033  59    0.031  27    0.021 342    0.026 316
DCP 7     .149      1.661    0.362   6    0.059 325    0.251 163    0.039  66    0.021 348    0.011 331    0.003 267    0.006 186    0.002 156
DCP 8     .200      1.397    0.411   6    0.109 265    0.083 168    0.052  57    0.026 353    0.036 203    0.031 230    0.021 119    0.016  63
DCP 9     .250      1.227    0.380 359    0.117 290    0.113 117    0.081  12    0.066 286    0.032 217    0.027 136    0.015  57    0.014 353
DCP10     .300      1.037    0.288   4    0.076 253    0.069 116    0.050   0    0.028 257    0.017 188    0.014  95    0.008 358    0.006 325
DCP11     .399      0.821    0.196  21    0.027 292    0.036 115    0.028 346    0.014 236    0.038 140    0.006  76    0.013 312    0.006 214
DCP12     .501      0.639    0.163  36    0.028 316    0.033 130    0.026 333    0.015 231    0.036  63    0.033 287    0.033 208    0.031 179
DCP13     .600      0.675    0.113  59    0.035 350    0.030 125    0.014 327    0.008 175    0.035   6    0.032  65    0.030 358    0.037 178
DCP14     .701      0.613    0.100  90    0.037 353    0.030 151    0.011 328    0.007 181    0.036 317    0.033 136    0.033 196    0.031 129
DCP15     .800      0.192    0.074  96    0.026 328    0.014 136    0.010 341    0.021 208    0.032 293    0.036 127    0.037 226    0.032 353
DCP16     .900     -0.253    0.027  49    0.019 236    0.017  80    0.007 268    0.007  46    0.032 183    0.007 316    0.005 177    0.001  78
DCP17     .965     -0.076    0.038  12    0.016 213    0.038  83    0.031 276    0.033 343    0.032 114    0.032 353    0.032  83    0.035 287

                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0         45.56        0.136        0.507        2.77         0.0          9.90       12121.1        20

          V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
                                     0.79E 07    -0.355        1.290        11.77       -0.00137     1.903        0.0
           170.4        74880.
          (559.0)      (1563.9)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               9.895    2.713   0    0.133  50    0.062 330    0.105 197    0.018  91    0.017  56    0.033 123    0.019 186    0.038 176
CN                  0.974    0.198  75    0.083  19    0.076 336    0.026 256    0.019 178    0.032 213    0.006 165    0.003 115    0.013 268
CM                  0.006    0.078 226    0.025  97    0.036  53    0.037  32    0.033 336    0.030 213    0.031 231    0.033  19    0.031 171

DCP 1     .010      4.716    0.345 162    0.467  82    0.149  17    0.061 352    0.078 331    0.022 355    0.070 302    0.017 267    0.014 138
DCP 2     .020      4.337    0.364 167    0.645  93    0.181  33    0.018 283    0.059  62    0.065  13    0.069 323    0.028 286    0.036 321
DCP 3     .033      4.367    0.360 172    0.460  97    0.146  60    0.030  85    0.078  41    0.067 263    0.011   3    0.035  23    0.035 360
DCP 4     .049      3.303    0.369 135    0.787  90    0.192 166    0.061 195    0.017 190    0.056  62    0.073  31    0.088  86    0.026 183
DCP 5     .076      2.693    0.578 137    0.305  76    0.192  61    0.163 176    0.172 165    0.096 166    0.139 202    0.068 236    0.076 263
DCP 6     .099      2.368    0.306  99    0.311  63    0.152   8    0.076   4    0.069  10    0.067  66    0.069  67    0.029  53    0.036 130
DCP 7     .149      1.806    0.360  74    0.236  20    0.102 338    0.076 309    0.031 277    0.016 311    0.008 358    0.020 335    0.037 263
DCP 8     .200      1.508    0.357  66    0.215  14    0.131 316    0.083 306    0.067 268    0.020 209    0.027 283    0.015 253    0.025 235
DCP 9     .250      1.367    0.367  56    0.212 356    0.113 300    0.096 275    0.071 236    0.060 217    0.033 293    0.029 192    0.029 181
DCP10     .300      1.130    0.313  55    0.155 340    0.075 307    0.077 261    0.038 207    0.028 221    0.029 167    0.013 128    0.017 148
DCP11     .399      0.800    0.269  65    0.133 341    0.033 330    0.059 263    0.033 190    0.016 235    0.022 166    0.023  87    0.036  73
DCP12     .501      0.679    0.214  68    0.087 328    0.071 273    0.063 237    0.026 151    0.036 133    0.011 105    0.006 108    0.007  37
DCP13     .600      0.529    0.178  75    0.076 308    0.030 212    0.031 226    0.023 130    0.037  83    0.013  33    0.036 296    0.037   6
DCP14     .701      0.636    0.167  86    0.073 291    0.012 177    0.030 212    0.019 136    0.035  36    0.005 357    0.005 191    0.038 326
DCP15     .800      0.238    0.113  55    0.068 269    0.011 330    0.028 177    0.012  47    0.032 193    0.005  12    0.006 133    0.005 315
DCP16     .900     -0.215    0.088  18    0.062 263    0.031 253    0.017 164    0.007  26    0.037   3    0.033 276    0.035 182    0.038 276
DCP17     .965     -0.052    0.066  13    0.019 276    0.038 278    0.011 189    0.006 135    0.037  69    0.003   4    0.033  37    0.036 344
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0         45.58       0.138        0.501       2.64        0.0         12.44      12121.2      20

            V           Q           RN           CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOP         EXT DAMP
                                     0.79E 07    -0.069       1.313       11.85      -0.00179     2.446       0.0
             168.1       73467.
            (551.6)     (1534.4)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              12.444   2.639   0   0.048 348   0.128 176   0.063 116   0.032  30   0.007  50   0.018 275   0.005 188   0.008 354
CN                  1.014   0.223  97   0.052 134   0.031 114   0.012 117   0.004  60   0.006 305   0.007 286   0.003  32   0.002  53
CM                 -0.039   0.051 207   0.007 225   0.039 176   0.004 243   0.003 201   0.001 154   0.001 126   0.001 268   0.000  40

DCP 1     .010      4.425   0.912 170   0.371 143   0.069 161   0.027 266   0.014 278   0.006 133   0.013  15   0.020 187   0.012  31
DCP 2     .020      4.144   1.122 175   0.073 132   0.179 199   0.039 294   0.057 243   0.030 331   0.020 302   0.023 310   0.010  89
DCP 3     .030      3.926   1.193 193   0.095 178   0.288 206   0.033 276   0.089 222   0.055 352   0.039 261   0.039 348   0.021 187
DCP 4     .049      3.302   1.159 171   0.311 250   0.121 169   0.093 288   0.083  27   0.013  75   0.036  78   0.031 123   0.016 101
DCP 5     .074      2.632   0.830 146   0.236 210   0.036 192   0.051   7   0.013  47   0.015 306   0.029 269   0.030 333   0.012 323
DCP 6     .099      2.306   0.996 123   0.163 154   0.132 152   0.032 278   0.014 241   0.019 335   0.035 250   0.017  32   0.028 341
DCP 7     .149      1.846   0.410  97   0.113 130   0.126 119   0.063 154   0.031 155   0.017 243   0.011 268   0.030 268   0.006 168
DCP 8     .200      1.606   0.408  98   0.169 146   0.118 140   0.064 106   0.016 247   0.028 306   0.020 306   0.016   2   0.000 328
DCP 9     .250      1.473   0.420  82   0.187 119   0.132 115   0.057 149   0.020 226   0.031 232   0.017 286   0.009 327   0.012  79
DCP10     .300      1.260   0.353  76   0.140 120   0.098 101   0.039 167   0.028 165   0.016 226   0.012 232   0.008 306   0.007  59
DCP11     .399      0.999   0.300  75   0.088 114   0.052  73   0.065 121   0.035  87   0.007 101   0.009 293   0.012 135   0.031 180
DCP12     .501      0.739   0.264  67   0.051  97   0.036  14   0.033  83   0.024  42   0.013  33   0.002 336   0.012 143   0.015  85
DCP13     .600      0.563   0.199  62   0.016  97   0.025 355   0.018  65   0.014  21   0.039 336   0.039 251   0.010  39   0.032 305
DCP14     .701      0.463   0.165  55   0.009 259   0.023 344   0.014  23   0.017 338   0.035 339   0.011 349   0.037 352   0.011 290
DCP15     .800      0.276   0.168  38   0.016  17   0.022 325   0.018  33   0.008   8   0.014 321   0.036 350   0.032 229   0.002 140
DCP16     .900      0.365   0.125  21   0.032  30   0.011 343   0.006 355   0.008   3   0.035 288   0.006 309   0.007 100   0.006 108
DCP17     .969     -0.018   0.054  24   0.020  45   0.011  46   0.006  12   0.004 276   0.002 259   0.006 316   0.035  66   0.006  13
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0         45.57       0.139        0.498       2.66        0.0         14.89      12121.3      20

            V           Q           RN           CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOP         EXT DAMP
                                     0.79E 07    -0.092       1.220       13.96      -0.00219     2.570       0.0
             166.8       72539.
            (547.2)     (1515.0)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              14.886   2.663   0   0.067 346   0.033 246   0.052 133   0.017  35   0.009  45   0.014 182   0.013 213   0.002 349
CN                  1.006   0.167  89   0.038 135   0.015 220   0.011 177   0.003 150   0.002 332   0.001 103   0.001 281   0.001 253
CM                 -0.047   0.065 213   0.011 251   0.002 308   0.002 296   0.002 276   0.001  11   0.000  40   0.001 229   0.002 192

DCP 1     .010      3.733   0.309 158   0.072 281   0.008 350   0.006 227   0.008 348   0.007  89   0.018  71   0.013  80   0.022 127
DCP 2     .020      3.473   0.456 155   0.114 283   0.011 115   0.010 161   0.020 356   0.019 123   0.073 187   0.007  98   0.013 161
DCP 3     .030      3.342   0.716 173   0.253 259   0.122 343   0.034 156   0.040 275   0.031  73   0.010 152   0.021 233   0.024  97
DCP 4     .049      2.646   0.623 156   0.136 210   0.060 272   0.027 187   0.007 201   0.007  51   0.018 198   0.009 314   0.023 259
DCP 5     .074      2.178   0.681 145   0.092 191   0.062 258   0.040 179   0.004 226   0.020  17   0.010  78   0.024 305   0.015 280
DCP 6     .099      1.998   0.359 137   0.386 185   0.067 240   0.039 205   0.023 156   0.005 261   0.028  88   0.012 246   0.017 249
DCP 7     .149      1.731   0.288 115   0.106 159   0.058 249   0.022 236   0.017 312   0.011  78   0.013   1   0.017 177   0.039 235
DCP 8     .200      1.517   0.229 110   0.095 165   0.025 293   0.008 183   0.019   7   0.032 137   0.012  18   0.039 289   0.010 259
DCP 9     .250      1.432   0.251  99   0.085 149   0.039 230   0.021 255   0.012 277   0.031 253   0.012 171   0.012 333   0.008 277
DCP10     .300      1.275   0.237  94   0.078 140   0.038 188   0.016 203   0.014 213   0.013 323   0.004 285   0.008 141   0.014 169
DCP11     .399      1.086   0.228  79   0.063 120   0.027 217   0.019 153   0.027 192   0.012 333   0.011 355   0.015  16   0.008 239
DCP12     .501      0.855   0.212  60   0.065 117   0.015 158   0.006 157   0.010 145   0.015 262   0.009 267   0.014 266   0.012 184
DCP13     .600      0.680   0.193  45   0.042 107   0.014 151   0.012 180   0.021 121   0.009 296   0.036 164   0.012 142   0.014 102
DCP14     .701      0.569   0.196  43   0.043  72   0.003 127   0.013 142   0.018  62   0.037 149   0.011 147   0.011  90   0.018  67
DCP15     .800      0.378   0.173  38   0.037  56   0.003 195   0.010 113   0.000  49   0.002 287   0.004 224   0.005  43   0.013 341
DCP16     .900      0.135   0.119  41   0.026  48   0.035  73   0.009  59   0.011  12   0.013 139   0.035 354   0.010 346   0.016 324
DCP17     .969      0.015   0.067  48   0.018  46   0.034 123   0.006 181   0.003 160   0.006 155   0.005  46   0.031 268   0.008 316
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                               FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0         45.60       0.140       0.497       2.67        0.0         17.60      12121.4      20

              V            Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                                       0.79E 07   -0.112       1.157       17.41      -0.00181     2.448       0.0
              166.2        77304.
             (545.2)      (1510.1)                                     HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.596   2.666   0   0.066  18   0.026 231   0.058  55   0.033  30   0.005  62   0.017 207   0.008 200   0.018   5
CN                1.012   0.132  85   0.013  30   0.036 208   0.006  44   0.007  78   0.033 254   0.035 273   0.033 192   0.036 147
CM               -0.069   0.036 222   0.005 217   0.001 328   0.001 111   0.001 214   0.001   5   0.002  53   0.001 332   0.001 268

DCP 1     .010    3.651   0.376 151   0.058  46   0.058  26   0.007 303   0.022  60   0.026  28   0.076 134   0.033 322   0.013 258
DCP 2     .020    3.161   0.342 151   0.085  83   0.067  22   0.011   6   0.027  11   0.012  64   0.019 126   0.029 266   0.005 318
DCP 3     .030    2.820   0.441 167   0.066  66   0.043 327   0.033   0   0.034  48   0.015 168   0.015  67   0.018 270   0.027 204
DCP 4     .049    2.411   0.328 144   0.054 307   0.021 331   0.033  72   0.012 250   0.010 332   0.001 170   0.013   0   0.015  40
DCP 5     .074    2.059   0.202 139   0.083 254   0.036 210   0.041 107   0.035 176   0.004 115   0.030 168   0.003 151   0.003   3
DCP 6     .099    1.917   0.150 171   0.031 269   0.040 207   0.023  84   0.009 111   0.003 283   0.013 258   0.013 125   0.023 218
DCP 7     .149    1.487   0.148 117   0.012 239   0.041 230   0.028  98   0.025 137   0.018 258   0.019  65   0.013 335   0.016 162
DCP 8     .200    1.448   0.153 129   0.002 206   0.011 330   0.020  68   0.026 107   0.016 336   0.005  73   0.004 272   0.010 306
DCP 9     .250    1.380   0.144 110   0.014 257   0.012 277   0.008  78   0.015 136   0.038 324   0.036 152   0.032 232   0.008 140
DCP10     .300    1.249   0.183  96   0.013 167   0.036 253   0.010  79   0.013  33   0.029  68   0.006 239   0.035 206   0.008 130
DCP11     .398    1.106   0.207  81   0.025  73   0.013 158   0.024  22   0.017  54   0.009 307   0.017 247   0.038 266   0.008 180
DCP12     .501    0.990   0.183  69   0.021  54   0.038 114   0.015  39   0.015  57   0.039 221   0.013 148   0.011 157   0.020 133
DCP13     .600    0.769   0.166  58   0.022  20   0.003 300   0.018 305   0.015  27   0.012 222   0.008 222   0.017 203   0.018 100
DCP14     .701    0.637   0.152  47   0.019  33   0.013 230   0.018 274   0.001 177   0.003 124   0.017 233   0.035 103   0.035   4
DCP15     .800    0.473   0.141  41   0.019  78   0.037 159   0.000 290   0.007 224   0.036  51   0.036 267   0.006  25   0.001 289
DCP16     .900    0.191   0.105  48   0.021  28   0.013 149   0.005 169   0.005 148   0.036 169   0.014 296   0.005 147   0.004 309
DCP17     .965    0.036   0.046  58   0.015   3   0.036  53   0.007 106   0.002 347   0.002 336   0.007   1   0.007 117   0.003 288

                               FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0         69.96       0.211       0.498       3.12        0.0        -0.02       12123.1      20

              V            Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                                       0.80E 07   -0.331       0.358       3.23       -0.00061     0.844       0.0
              166.6        73932.
             (546.5)      (1544.1)                                     HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            -0.018   3.119   0   0.002 315   0.083 232   0.018 152   0.002 161   0.036  64   0.003 173   0.007 216   0.004 256
CN                0.112   0.264 358   0.007 332   0.035 250   0.003 220   0.001 241   0.003 125   0.002 209   0.001 107   0.001 154
CM               -0.015   0.016 296   0.001 256   0.001  98   0.001  69   0.000 155   0.001 333   0.001  93   0.000 250   0.000 332

DCP 1     .010   -0.036   1.403 339   0.278   2   0.030 131   0.015  98   0.014 173   0.036  68   0.005 306   0.037  60   0.013 121
DCP 2     .020   -0.463   1.315 346   0.065 300   0.010 185   0.011 167   0.010 163   0.036  74   0.001 246   0.001 191   0.002 147
DCP 3     .030   -0.163   1.131 345   0.061 279   0.012 195   0.009 162   0.006 167   0.003  97   0.005 290   0.002 103   0.003 116
DCP 4     .049    0.160   0.914 347   0.040 277   0.010 212   0.006 118   0.007 161   0.005  48   0.008 360   0.002 275   0.002   0
DCP 5     .074    0.290   0.756 347   0.029 283   0.038 236   0.004 102   0.005 197   0.004  47   0.002   9   0.001 276   0.003 195
DCP 6     .099    0.358   0.631 349   0.039 295   0.008 240   0.005 136   0.004 183   0.003  41   0.003 357   0.002 296   0.002 227
DCP 7     .149    0.247   0.451 351   0.013 346   0.013 274   0.003 162   0.007 241   0.007 101   0.007  16   0.006 247   0.002 358
DCP 8     .200    0.195   0.384 359   0.013 307   0.004 236   0.004 185   0.002 183   0.033 125   0.035  28   0.032  14   0.003 189
DCP 9     .250    0.181   0.325 355   0.007 321   0.007 262   0.001 246   0.002 179   0.032   6   0.004 276   0.004 174   0.035  79
DCP10     .300    0.183   0.271 357   0.010 336   0.006 264   0.004 237   0.005 200   0.004 115   0.036 226   0.001 145   0.007 288
DCP11     .395    0.169   0.220  11   0.008 347   0.036 258   0.038 230   0.005 263   0.003  92   0.036 226   0.003 110   0.002 119
DCP12     .501    0.114   0.166  16   0.011  13   0.004 210   0.004 260   0.003 298   0.034 180   0.001  54   0.001  56   0.004 297
DCP13     .600    0.128   0.124  23   0.007  27   0.003 236   0.003 274   0.003 344   0.007 119   0.033 289   0.032  90   0.001 198
DCP14     .701    0.203   0.085  33   0.033  53   0.035 226   0.002 246   0.004 332   0.037 169   0.005 282   0.032 192   0.002 196
DCP15     .800    0.083   0.052  43   0.006  63   0.007 309   0.006 246   0.002  90   0.004 137   0.003 257   0.004  44   0.002 136
DCP16     .900   -0.103   0.021  74   0.001 344   0.037 296   0.035 195   0.001 122   0.002 155   0.008 289   0.001  86   0.004 119
DCP17     .969   -0.051   0.020 193   0.003 135   0.004 221   0.003  35   0.003 269   0.003 193   0.035 103   0.004  75   0.003 314
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                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   3.0         69.99 .     0.212        0.496        3.13         0.0          2.50         12123.7       20

                  V           Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TPR          EXT DAMP
                                           0.89E 07     -0.028       0.649        5.74         -0.00067     0.924        0.0
                  165.9        73616.
                  (544.2)     (1537.5).                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.499    3.132   0    0.100 317    0.093 186    0.017 176    0.029  53    0.024  91    0.013 163    0.005 210    0.009 227
CN                  0.395    0.246 358    0.008 336    0.031 179    0.002 218    0.002 147    0.002  96    0.008 118    0.003   5    0.001 291
CM                 -0.009    0.018 296    0.002 233    0.000  14    0.000 127    0.001  23    0.000  23    0.002 328    0.000 164    0.000 184

DCP 1     .010      1.033    1.647 339    0.028 265    0.025 171    0.005 314    0.009 357    0.013  92    0.017 338    0.011 317    0.008 262
DCP 2     .020      0.966    1.323 346    0.041 289    0.035 129    0.005 158    0.011  43    0.010 143    0.023 357    0.003   9    0.007 292
DCP 3     .030      1.064    1.150 345    0.041 275    0.005 133    0.002 105    0.008  58    0.002 284    0.016  52    0.003  55    0.002 339
DCP 4     .049      1.172    0.981 346    0.040 271    0.008 156    0.006 136    0.003  68    0.008  31    0.012 129    0.008  85    0.002 253
DCP 5     .074      1.133    0.779 347    0.031 277    0.003 185    0.002 138    0.008  68    0.003 323    0.015 126    0.005  68    0.004 291
DCP 6     .099      1.066    0.651 348    0.026 317    0.011 273    0.016 174    0.012  81    0.003 321    0.010  74    0.003  36    0.023 287
DCP 7     .149      0.766    0.470 351    0.019 282    0.003 185    0.010 164    0.004  21    0.010 135    0.005  19    0.006  72    0.004 123
DCP 8     .200      0.616    0.386 358    0.015 356    0.000 174    0.003 167    0.003 185    0.002 287    0.016 113    0.006 345    0.004 312
DCP 9     .250      0.561    0.326 357    0.013 342    0.004 116    0.000 161    0.002 135    0.003 127    0.020  88    0.003 306    0.006 261
DCP10     .300      0.492    0.272 358    0.010 341    0.003 112    0.004 245    0.003 106    0.007  93    0.017 119    0.007  18    0.004 259
DCP11     .399      0.416    0.217  13    0.008   7    0.003 267    0.005 284    0.002 192    0.005 126    0.011 170    0.009 338    0.001  76
DCP12     .501      0.300    0.166  18    0.009   6    0.003 121    0.002 237    0.003 205    0.005 136    0.011 153    0.002 353    0.001 303
DCP13     .600      0.268    0.130  26    0.009  23    0.002 156    0.002 285    0.006 155    0.002 262    0.008 125    0.005 315    0.002 256
DCP14     .701      0.337    0.085  36    0.007  15    0.002 167    0.002 224    0.003 186    0.004  16    0.013 164    0.006 347    0.007  55
DCP15     .800      0.138    0.056  51    0.009  68    0.001 233    0.002   8    0.003 221    0.005 249    0.006  85    0.002 147    0.001 155
DCP16     .900     -0.088    0.025  81    0.003  97    0.001 144    0.002 238    0.006 191    0.001 337    0.013  88    0.004 355    0.003 350
DCP17     .965     -0.063    0. 16 179    0.001 306    0.004 283    0.004  13    0.007 355    0.004 133    0.018 242    0.004 133    0.006 238


                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   3.0         69.99       0.213        0.496        3.16         0.0          4.96         12123.9       20

                  V           Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TPR          EXT DAMP
                                           0.89E 07     -0.126       0.927        8.28         -0.00074     1.011        0.0
                  164.9        73008.
                  (541.0)     (1524.8)                                     HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.960    3.156   0    0.099 317    0.138 178    0.017 107    0.013  65    0.020  66    0.006 331    0.006 281    0.007 282
CN                  0.665    0.265 350    0.039 328    0.036 271    0.007 164    0.002  70    0.001  38    0.090 163    0.003  65    0.001 172
CM                 -0.003    0.029 298    0.007 311    0.001 196    0.001  31    0.000 320    0.001 228    0.002 336    0.000 177    0.001 326

DCP 1     .010      2.878    1.087 336    0.171 219    0.023 176    0.050 178    0.062  67    0.035 336    0.009 263    0.016 260    [illegible]
DCP 2     .020      2.483    1.507 345    0.263 243    0.163 135    0.055  25    0.042 115    0.047   4    0.072 264    0.019 152    0.035 215
DCP 3     .030      2.336    1.323 346    0.178 241    0.175 132    0.151  27    0.101 282    0.033 160    0.033 283    0.026 130    0.081  27
DCP 4     .049      2.162    0.919 346    0.094  35    0.002 305    0.077 186    0.042  60    0.008 336    0.019 110    0.013 318    0.068 219
DCP 5     .074      1.961    0.789 347    0.079 340    0.013 271    0.010 196    0.039 130    0.014  52    0.015 229    0.011 190    0.035 166
DCP 6     .099      1.735    0.629 350    0.027 356    0.006 215    0.004 207    0.008  76    0.013  49    0.013 135    0.007  66    0.007 323
DCP 7     .149      1.250    0.463 351    0.023   1    0.005 218    0.003 172    0.003 141    0.001 129    0.005 345    0.002 315    0.003 226
DCP 8     .200      1.012    0.362   1    0.317 358    0.006 287    0.004 160    0.004  75    0.013 335    0.021 171    0.002  69    0.001  73
DCP 9     .250      0.879    0.308 348    0.016 359    0.011 237    0.005 150    0.003  78    0.005 123    0.023 123    0.033 356    0.005 258
DCP10     .300      0.777    0.258   3    0.012 358    0.009 313    0.003  98    0.001 196    0.006 128    0.023 168    0.006  62    0.031 216
DCP11     .399      0.641    0.211  15    0.013 346    0.006 253    0.002 181    0.001  33    0.006 136    0.019 156    0.002   5    0.006  66
DCP12     .501      0.478    0.165  21    0.019   5    0.006 253    0.006 179    0.005 241    0.005  87    0.017 176    0.000 277    0.001 119
DCP13     .600      0.308    0.122  31    0.007  17    0.001 157    0.002 169    0.002   3    0.039 341    0.012 166    0.003  71    0.002 151
DCP14     .701      0.391    0.085  42    0.009   1    0.006 253    0.003 203    0.004 147    0.003  19    0.013 193    0.001 171    0.002 107
DCP15     .800      0.187    0.059  56    0.007   1    0.006 271    0.006 266    0.002  63    0.006  36    0.008 166    0.003 316    0.006 166
DCP16     .900     -0.070    0.023  71    0.006 315    0.006 120    0.005 177    0.001 116    0.006  63    0.009  77    0.006  16    0.033 278
DCP17     .965     -0.071    0.009 173    0.003 111    0.006 127    0.002 187    0.005  63    0.035  90    0.013 295    0.003 176    0.038 145
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

         [illegible] HZ   DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYZED
           [illegible]    [illegible]  [illegible] [illegible] [illegible]  0.0       [illegible]  [illegible]  [illegible]

         V               Q            RN          CMEMINS      CNEMAXI     ALPHA,NMAX AERO DAMP    TOP          SET TEMP
                                      [illegible] -0.016       1.170       10.41      [illegible]  [illegible]  [illegible]
          164.7           72883
         (540.2)         (1522.2)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C     HRS 0     HRS 1 PHI   HRS 2 PHI   HRS 3 PHI   HRS 4 PHI   HRS 5 PHI   HRS 6 PHI   HRS 7 PHI   HRS 8 PHI   HRS 9 PHI

ALPHA             [illegible]
CN                [illegible]
CM                [illegible]

DCP 1    .010     [illegible]
DCP 2    .020     [illegible]
DCP 3    [illegible] [illegible]
DCP 4    .040     [illegible]
DCP 5    .076     [illegible]
DCP 6    [illegible] [illegible]
DCP 7    .140     [illegible]
DCP 8    .200     [illegible]
DCP 9    [illegible] [illegible]
DCP10    .300     [illegible]
DCP11    [illegible] [illegible]
DCP12    .501     [illegible]
DCP13    .600     [illegible]
DCP14    .701     [illegible]
DCP15    .800     [illegible]
DCP16    .900     [illegible]
DCP17    .965     [illegible]

                    FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

         [illegible] HZ   DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYZED
           [illegible]    69.13        0.212      0.695        [illegible]  0.0       [illegible]  12125.1      29

         V               Q            RN          CMEMINS      CNEMAXI     ALPHA,NMAX AERO DAMP    TOP          SET TEMP
                                      [illegible] [illegible]  [illegible] [illegible] [illegible] [illegible]  [illegible]
          165.7           73592.
         (543.7)         (1537.0)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C     HRS 0     HRS 1 PHI   HRS 2 PHI   HRS 3 PHI   HRS 4 PHI   HRS 5 PHI   HRS 6 PHI   HRS 7 PHI   HRS 8 PHI   HRS 9 PHI

ALPHA             [illegible]
CN                [illegible]
CM                [illegible]

DCP 1    .010     [illegible]
DCP 2    .020     [illegible]
DCP 3    .030     [illegible]
DCP 4    .040     [illegible]
DCP 5    .076     [illegible]
DCP 6    .100     [illegible]
DCP 7    .140     [illegible]
DCP 8    .200     [illegible]
DCP 9    .250     [illegible]
DCP10    .300     [illegible]
DCP11    .400     [illegible]
DCP12    .501     [illegible]
DCP13    .600     [illegible]
DCP14    .701     [illegible]
DCP15    .800     [illegible]
DCP16    .900     [illegible]
DCP17    .965     [illegible]
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                                  FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                    0.0        69.19        0.214        0.492        2.91        0.0          12.49        12125.2       20

                  V           Q            RN           CN(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                                            0.80E 07    -0.133        1.471       13.76       -0.00129      1.741        0.0
                  164.6       72979.
                 (540.1)     (1524.2)                                     HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               12.486    2.912   0    0.144  53    0.091 222    0.027 156    0.018  67    0.012  33    0.012 222    0.007  96    0.002  87
CN                   1.078    0.360  72    0.062  40    0.063 352    0.016 274    0.002 135    0.004 335    0.001  86    0.005 348    0.004 192
CM                  -0.017    0.074 232    0.017 127    0.029 139    0.006  53    0.032 302    0.001 136    0.009 276    0.001 194    0.000  48

DCP 1     .010       6.365    0.864 155    0.367  78    0.087 151    0.044 111    0.016 163    0.037 143    0.021  87    0.019 255    0.019 145
DCP 2     .020       6.265    0.964 155    0.290  78    0.136 171    0.012 340    0.096 215    0.033 163    0.046 207    0.016 170    0.020 214
DCP 3     .030       5.776    1.291 165    0.333 108    0.244 161    0.065 347    0.100 210    0.049 263    0.066 197    0.051 272    0.067 217
DCP 4     .049       5.239    1.151 140    0.145 177    0.139 151    0.192 238    0.085 291    0.057 226    0.055 223    0.028 325    0.018 258
DCP 5     .074       2.605    0.954 117    0.273 195    0.164 145    0.117 266    0.075 228    0.069 341    0.065  51    0.011  95    0.040 156
DCP 6     .099       2.333    0.716 130    0.218  65    0.195 196    0.045 144    0.073 169    0.358 219    0.023 345    0.068 279    0.027 267
DCP 7     .149       1.853    0.478  83    0.194  57    0.237  58    0.030  36    0.051 101    0.069 143    0.031 112    0.025 173    0.023 160
DCP 8     .200       1.550    0.588  79    0.175  61    0.162  48    0.038  67    0.051  48    0.022 139    0.077  97    0.020 112    0.035 137
DCP 9     .250       1.359    0.576  68    0.164  44    0.169  18    0.055  16    0.055  17    0.065  63    0.026  31    0.036  56    0.016  42
DCP10     .300       1.173    0.494  63    0.111  41    0.128   6    0.066 354    0.041 343    0.039   1    0.021 323    0.020 349    0.013 321
DCP11     .399       0.870    0.475  66    0.070  34    0.111 357    0.032 312    0.018 344    0.073 355    0.009  16    0.020 354    0.009 297
DCP12     .501       0.757    0.429  56    0.061   7    0.138 332    0.030 276    0.014 238    0.015 338    0.033 254    0.007 316    0.007 115
DCP13     .600       0.602    0.371  49    0.066 325    0.093 301    0.035 259    0.028 182    0.021 286    0.014 281    0.002 163    0.036 158
DCP14     .701       0.496    0.318  62    0.067 293    0.090 278    0.031 263    0.018 146    0.010 235    0.006  86    0.007 330    0.006 228
DCP15     .800       0.311    0.276  26    0.056 331    0.068 257    0.022 209    0.013 130    0.007 196    0.032 273    0.001 195    0.008 214
DCP16     .900       0.096    0.189  13    0.075 313    0.052 250    0.035 187    0.010 106    0.009 137    0.007 121    0.010  23    0.036  19
DCP17     .969      -0.017    0.387  19    0.046 340    0.029 276    0.030 240    0.008 137    0.030 196    0.036 333    0.033   8    0.037 184
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                                  FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                    0.0        69.18        0.215        0.491        2.93        0.0          14.96        12125.3       20

                  V           Q            RN           CN(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                                            0.80E 07    -0.133        1.400       15.21       -0.00165      2.236        0.0
                 164.0        72596.
                (537.9)      (1516.2)                                     HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               14.958    2.926   0    0.053 190    0.063 195    0.032  72    0.031 351    0.005  90    0.019 176    0.002   1    0.007 327
CN                   1.025    0.301  75    0.062  73    0.013 109    0.010   8    0.004  23    0.004 167    0.001 117    0.001 166    0.007 139
CM                  -0.036    0.074 210    0.025 202    0.005 218    0.004 179    0.001 251    0.032   5    0.003 161    0.001 335    0.032 306

DCP 1     .010       3.995    0.922 155    0.108 263    0.028 232    0.041 301    0.052 315    0.028 334    0.015  61    0.025 356    0.023 108
DCP 2     .020       3.965    0.968 161    0.185 266    0.033 115    0.035 313    0.096  22    0.025  55    0.019  11    0.023 113    0.019 221
DCP 3     .030       3.442    1.255 171    0.276 234    0.022  27    0.063 264    0.077  16    0.040 103    0.026 164    0.020 131    0.041 223
DCP 4     .049       2.961    0.869 140    0.200 219    0.128 313    0.087  29    0.023 110    0.032 133    0.015 210    0.007 272    0.007 340
DCP 5     .074       2.416    0.593 119    0.153 176    0.038 230    0.046 316    0.024 355    0.033  63    0.009 352    0.028  11    0.036 309
DCP 6     .099       2.188    0.475 109    0.162 148    0.035 261    0.048 246    0.037 276    0.012  41    0.011  67    0.019   5    0.019 336
DCP 7     .149       1.821    0.420  95    0.180 137    0.052 192    0.021 131    0.033 243    0.018 169    0.004   9    0.006 268    0.036  92
DCP 8     .200       1.561    0.454  96    0.165 145    0.088 201    0.012 260    0.026 347    0.022 292    0.009 206    0.013  67    0.001 334
DCP 9     .250       1.439    0.441  83    0.179 100    0.076 153    0.026 134    0.003 353    0.037 262    0.005 291    0.008 191    0.009 126
DCP10     .300       1.272    0.433  71    0.147  87    0.072 123    0.016 111    0.016 165    0.016 333    0.005 256    0.009 228    0.036 143
DCP11     .399       1.076    0.452  65    0.146  72    0.069 108    0.034 101    0.024 145    0.034 270    0.008 197    0.021 252    0.034 174
DCP12     .501       0.830    0.413  56    0.143  52    0.060  64    0.035  22    0.013  58    0.015 136    0.009 116    0.012 168    0.019  77
DCP13     .600       0.636    0.354  48    0.112  39    0.031  12    0.024   1    0.009  36    0.034 272    0.007 314    0.018  91    0.014 335
DCP14     .701       0.507    0.291  30    0.090  18    0.010   4    0.023 320    0.005  30    0.039 196    0.007  73    0.036 148    0.004  30
DCP15     .800       0.358    0.269  33    0.096 359    0.017 346    0.016 345    0.002 320    0.010 199    0.003  86    0.003 255    0.011 151
DCP16     .900       0.179    0.184  33    0.062 351    0.018 335    0.013 326    0.012  26    0.013 149    0.039 280    0.004  51    0.010 145
DCP17     .969       0.007    0.385  67    0.037   7    0.011 320    0.011 338    0.003  69    0.038 143    0.005 314    0.011 169    0.032 157
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNER HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        69.18       0.215       0.481        7.96        0.0        17.53       12125.4      20

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TPP         EXT DAMP
                                      3.80E 07   -0.134        1.710       17.78     -0.00177      7.493       0.0
              163.6       72515.
             (536.8)     (1514.5)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             17.530   7.964   0   0.049 328   0.067 195   0.094  92   0.032 356   0.006 121   0.008 187   0.007 140   0.006  65
CN                 1.015   0.257  76   0.036  61   0.009 173   0.009  96   0.002 126   0.003 309   0.005 171   0.001   1   0.005 111
CM                -0.065   0.069 221   0.012 200   0.003 246   0.003 240   0.001 259   0.000 351   0.002 284   0.000  33   0.002 327

UCP 1    .010      3.527   0.711 151   0.052 252   0.070  67   0.034 239   0.009 248   0.019  96   0.011 321   0.037 182   0.013  52
UCP 2    .020      3.287   0.561 153   0.063 160   0.056  86   0.003 243   0.027  51   0.018 358   0.014 289   0.020 141   0.006 135
UCP 3    .030      2.797   0.704 158   0.029 129   0.083 231   0.013 218   0.040 325   0.007 110   0.029  79   0.018 155   0.016  92
UCP 4    .049      2.515   0.518 172   0.062 173   0.008 176   0.019 214   0.007 357   0.022 356   0.012 279   0.016  50   0.012  61
UCP 5    .074      2.184   0.449 132   0.050 120   0.019 247   0.012 239   0.015 328   0.007 218   0.018 305   0.015  79   0.015 133
UCP 6    .099      1.882   0.311  97   0.061 101   0.037 232   0.030  66   0.025  44   0.008 288   0.009  82   0.011 295   0.015  37
UCP 7    .149      1.720   0.281  99   0.040 131   0.034 219   0.002 323   0.007 177   0.019 323   0.023 256   0.036 268   0.017 338
UCP 8    .200      1.553   0.336  92   0.035 140      26 238   0.008 168   0.020 172   0.009  71   0.009 307   0.014 344   0.022  48
UCP 9    .250      1.385   0.325  81   0.045 116   0.040 210   0.034 185   0.015 278   0.036  43   0.034 134   0.017  52   0.009   5
UCP10    .300      1.267   0.304  73   0.050 102   0.022 233   0.023 125   0.012 216   0.009 281   0.013 189   0.015  15   0.008 210
UCP11    .399      1.083   0.325  69   0.056  75   0.020 230   0.019  81   0.017 230   0.014 286   0.013 231   0.006 273   0.004  12
UCP12    .501      0.886   0.332  67   0.051  67   0.021 142   0.008 119   0.013 161   0.004 163   0.029 153   0.038 265   0.012 141
UCP13    .600      0.775   0.302  55   0.063  36   0.030  68   0.026  89   0.017 118   0.039 262   0.016 117   0.010 167   0.013 187
UCP14    .701      0.626   0.274  45   0.059  21   0.013 171   0.018  73   0.013 100   0.003 216   0.014  64   0.008 121   0.013 135
UCP15    .800      0.474   0.265  43   0.057   8   0.010  78   0.011  40   0.013  43   0.011  96   0.011  97   0.009 192   0.014 142
UCP16    .900      0.178   0.175  47   0.030   1   0.017  45   0.012   8   0.016 331   0.004  66   0.036  72   0.008 319   0.007  47
UCP17    .969      0.033   0.095  61   0.015  38   0.008  36   0.009  28   0.030  76   0.007 259   0.004  43   0.032 100   0.001 325


                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNER HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        23.11       0.060       0.595        2.44        0.0        -0.01       12127.1      25

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TPP         EXT DAMP
                                      3.99E 07   -0.026        0.411        2.47     -0.00071      1.134       0.0
              197.1       103977.
             (646.8)     (2171.6)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             -0.013   2.445   0   0.063 358   0.056 215   0.023 122   0.027  69   0.015  33   0.023 193   0.018 159   0.011   8
CN                 0.127   0.293 352   0.035 327   0.000 269   0.001 330   0.009 168   0.030  81   0.003 271   0.007 172   0.001 148
CM                -0.015   0.008 321   0.003 353   0.000 116   0.000 168   0.000 156   0.000 355   0.000  57   0.003 330   0.000  67

UCP 1    .010     -0.063   2.009 347   0.186  50   0.051 127   0.034  69   0.016 138   0.037 210   0.032 355   0.003 330   0.007 170
UCP 2    .020     -0.490   1.419 349   0.075   8   0.075 130   0.050 218   0.052 293   0.056  13   0.045  86   0.024 169   0.013 208
UCP 3    .030     -0.196   1.182 349   0.041 275   0.018 325   0.013  28   0.013 112   0.036 193   0.031 315   0.003 259   0.005 131
UCP 4    .049      0.178   1.361 349   0.037 279   0.002 138   0.007   3   0.005 127   0.006 256   0.032  98   0.003 291   0.007 103
UCP 5    .074      0.966   0.997 349   0.039 277   0.031 337   0.032 309   0.002 312   0.037 344   0.003 332   0.003 267   0.033 129
UCP 6    .099      0.401   0.756 355   0.071 284   0.002 149   0.031 347   0.002 143   0.033 359   0.031 349   0.003 283   0.003 108
UCP 7    .149      0.274   0.549 355   0.010 341   0.002 319   0.001 330   0.001 337   0.001 216   0.001 111   0.001 225   0.004  97
UCP 8    .200      0.228   0.453 353   0.038 311   0.001  93   0.003 251   0.003 125   0.007 194   0.033  73   0.002 314   0.036 121
UCP 9    .250      0.193   0.387 351   0.007 336   0.031 244   0.002 300   0.001 159   0.001  43   0.001 257   0.000 130   0.002 161
UCP10    .300      0.196   0.325 351   0.005 340   0.001  76   0.002 266   0.002 116   0.001 233   0.032 186   0.032 103   0.033 164
UCP11    .399      0.176   0.269 355   0.036 338   0.031  53   0.033 310   0.002 165   0.002 131   0.032 232   0.033 145   0.035 167
UCP12    .501      0.176   0.196 357   0.004 343   0.032 331   0.001 297   0.001 278   0.001 123   0.002 322   0.002 125   0.001 150
UCP13    .600      0.131   0.147 358   0.002   3   0.002 277   0.000 355   0.009 103   0.031 259   0.032 256   0.001 219   0.031 223
UCP14    .701      0.219   0.133 358   0.031  20   0.001 284   0.001 318   0.001 301   0.001 173   0.001 259   0.032 190   0.002 257
UCP15    .800      0.086   0.057   2   0.009 236   0.001 [illegible]   0.003   7   0.001 288   0.001 199   0.001 160   0.007 166   0.001 177
UCP16    .900     -0.115   0.008  43   0.006 199   0.003 [illegible]   0.059 282   0.000   7   0.002 222   0.032 197   0.031 169   0.031 247
UCP17    .969     -0.056   0.019 180   0.002 313   0.000 209   0.002   9   0.001  91   0.003 115   0.031 286   0.032 138   0.001  75
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                  0.0        23.12        0.060      0.593        2.65        0.0         2.45      12127.2      20

                V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                                          0.95E 07  -0.018        0.701       5.18      -0.00085     1.375       0.0
                 196.0       103412.
                (643.1)     (2159.8)                             HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.449    2.651   0   0.059   5   0.060 215   0.025 127   0.038  29   0.008  18   0.022 196   0.015  89   0.016  20
CN                 0.414    0.290 352   0.008  19   0.003 309   0.002 212   0.001 310   0.000 124   0.002 119   0.002  67   0.001 346
CM                -0.007    0.010 325   0.002 243   0.000  49   0.000 198   0.000 109   0.000 233   0.001 209   0.001 234   0.000 224

DCP 1   .010       0.850    1.646 347   0.065  25   0.016 359   0.012  66   0.003 159   0.005 251   0.005 221   0.012 164   0.007 154
DCP 2   .020       0.891    1.350 349   0.065  42   0.019 330   0.004 195   0.001  51   0.002 245   0.006 261   0.007 165   0.003 208
DCP 3   .030       0.991    1.174 349   0.044  45   0.023 329   0.007 208   0.001  52   0.006 220   0.003 269   0.005 179   0.003 217
DCP 4   .049       1.273    1.133 349   0.017 359   0.036 325   0.016 217   0.002  71   0.006 219   0.001 306   0.005 170   0.002 324
DCP 5   .074       1.336    1.053 349   0.053 264   0.007 342   0.020 219   0.006 114   0.006 351   0.003 279   0.001 185   0.005 277
DCP 6   .099       1.376    1.015 350   0.136 256   0.039 152   0.004 198   0.012 128   0.038  16   0.005 266   0.036 162   0.002 304
DCP 7   .149       0.775    0.463 351   0.057  52   0.024 319   0.006 162   0.016 313   0.023 237   0.014 114   0.008  22   0.008 272
DCP 8   .200       0.633    0.416 353   0.037  50   0.014 330   0.005 216   0.002  82   0.001 260   0.001 261   0.003 166   0.002 342
DCP 9   .250       0.570    0.363 352   0.019  42   0.006 310   0.003 218   0.001  97   0.002  35   0.001  61   0.003  10   0.001 307
DCP10   .300       0.516    0.305 352   0.014  37   0.003 295   0.003 215   0.001   7   0.002  43   0.001  90   0.003  39   0.002  15
DCP11   .399       0.432    0.244 357   0.010  46   0.002 296   0.001 191   0.000 184   0.002  58   0.002  91   0.004  55   0.001  85
DCP12   .501       0.318    0.183 359   0.009  40   0.002 273   0.000 127   0.001 226   0.002  55   0.002  89   0.002  61   0.001  70
DCP13   .600       0.273    0.137   0   0.008  39   0.002 252   0.002 295   0.002 306   0.002  71   0.002  73   0.002  64   0.001  12
DCP14   .701       0.311    0.088   3   0.008  39   0.001 313   0.001  30   0.002 297   0.002 356   0.002 141   0.002  55   0.001  45
DCP15   .800       0.131    0.043   9   0.007  47   0.002 289   0.001 348   0.002 249   0.001 131   0.001 154   0.003  50   0.002  13
DCP16   .900      -0.107    0.009  17   0.003  63   0.002 255   0.000  33   0.002 351   0.002 219   0.006 142   0.003  51   0.002 342
DCP17   .965      -0.271    0.015 177   0.001   4   0.001 155   0.002  37   0.002 280   0.002  73   0.001 138   0.003  82   0.002  99

                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                  0.0        23.12        0.060      0.592        2.70        0.0         4.90      12127.3      20

                V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                                          0.94E 07  -0.010        0.976       7.63      -0.00121     1.883       0.0
                 195.2       102526.
                (640.4)     (2141.3)                             HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.909    2.704   0   0.074   4   0.070 221   0.032 197   0.026  16   0.011 292   0.009  93   0.003 112   0.011 341
CN                 0.696    0.270 356   0.020   0   0.007 256   0.006 199   0.004 117   0.001 295   0.001 146   0.001 228   0.002 108
CM                 0.006    0.019 333   0.003 240   0.000  99   0.001 283   0.001 143   0.000 231   0.000 106   0.000 164   0.000 128

DCP 1   .010       2.257    1.363 350   0.161  49   0.051 313   0.009 161   0.012 336   0.011 207   0.013 222   0.017 196   0.014 114
DCP 2   .020       2.190    1.226 351   0.053   0   0.013 292   0.040 236   0.021 142   0.019 225   0.019 118   0.002 233   0.017 103
DCP 3   .030       2.124    1.073 351   0.046 327   0.016 179   0.038 233   0.031 136   0.013 273   0.021 115   0.003  26   0.013 103
DCP 4   .049       2.267    0.910 350   0.073  33   0.067 157   0.002 292   0.032 129   0.006  12   0.008  98   0.010  14   0.001 105
DCP 5   .074       2.261    0.903 350   0.095  44   0.024 179   0.028  44   0.017 129   0.017  14   0.006  61   0.007 348   0.003  56
DCP 6   .099       2.230    1.005 350   0.124  54   0.053 314   0.050  50   0.002 186   0.030  22   0.007 308   0.006 323   0.003 129
DCP 7   .149       1.644    0.995 353   0.161 266   0.157 325   0.212 229   0.053 136   0.054 210   0.016 136.  0.035 182   0.029 105
DCP 8   .200       1.061    0.432   1   0.103 290   0.076 179   0.015 136   0.027 123   0.019  44   0.007 330   0.006 302   0.009 269
DCP 9   .250       0.910    0.339 356   0.052 279   0.064 162   0.033  79   0.015  55   0.016 359   0.006 290   0.004 297   0.003 266
DCP10   .300       0.765    0.227   0   0.023 333   0.049 153   0.046  50   0.025 313   0.007 246   0.003 219   0.002 178   0.001 110
DCP11   .399       0.628    0.165   5   0.039  52   0.009 314   0.002 163   0.001  38   0.003 294   0.003 200   0.001 186   0.003  62
DCP12   .501       0.469    0.130   7   0.027  45   0.006 305   0.003 162   0.001  18   0.001 300   0.001 118   0.001 345   0.001  44
DCP13   .600       0.380    0.091  13   0.025  45   0.007 307   0.006 181   0.001  65   0.001  62   0.001  30   0.002 348   0.001 135
DCP14   .701       0.370    0.063  33   0.023  48   0.007 307   0.005 137   0.002  94   0.001  33   0.001 117   0.001 349   0.002 120
DCP15   .800       0.162    0.025  47   0.013  44   0.006 297   0.005 192   0.001  91   0.001  93   0.000 358   0.001 314   0.001 132
DCP16   .900      -0.096    0.012  41   0.003 347   0.004 285   0.003 166   0.001 193   0.001 163   0.003 233   0.002 315   0.001 272
DCP17   .969      -0.082    0.007 174   0.004 267   0.002 137   0.001 132   0.001 322   0.000 257   0.001 203   0.001  13   0.002  65
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0        23.18      0.061        0.591        2.62        0.0         7.63        12127.4       20

                 V           Q           RN           CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP    TOP          EXT DAMP
                194.7       102478.      3.94E 07     0.337        1.065        8.59      -0.00146     2.268        0.0
               (638.9)      (2140.3)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.625     2.623   0   0.006  28   0.066 212   0.027  92   0.036  35   0.024 341   0.030 203   0.017 172   0.012  42
CN                 0.868     0.130  20   0.066  59   0.019  51   0.013  12   0.005   6   0.005 107   0.003 270   0.003 210   0.001 243
CM                 0.018     0.015 317   0.005  92   0.001 347   0.001  61   0.001 134   0.001  27   0.000 359   0.000 338   0.000 260

DCP 1     .010     3.285     0.664 356   0.176  47   0.038 110   0.013 182   0.036 315   0.013 182   0.019 270   0.007 234   0.007 261
DCP 2     .020     3.098     0.761 357   0.197  58   0.019  97   0.027  42   0.027 136   0.021 207   0.009 241   0.012 197   0.011 274
DCP 3     .030     2.936     0.736 357   0.172  56   0.021  79   0.036  36   0.025 133   0.012 203   0.007 165   0.013 191   0.008 271
DCP 4     .049     2.968     0.532 358   0.127  60   0.072 355   0.030   0   0.010 146   0.011   7   0.008 167   0.017 183   0.005 120
DCP 5     .074     2.863     0.336 357   0.200  79   0.112   0   0.234 343   0.019 335   0.020 324   0.016 222   0.015 172   0.007  90
DCP 6     .099     2.722     0.001 215   0.292  81   0.081  38   0.065  54   0.056   8   0.035 311   0.013 288   0.011 274   0.030 232
DCP 7     .149     2.066     0.268  16   0.478  66   0.025 144   0.075  56   0.009 127   0.006  27   0.030 135   0.016 153   0.025 285
DCP 8     .200     1.471     0.463  15   0.112  50   0.003   6   0.063  41   0.030 346   0.012  20   0.002 308   0.008  30   0.022  80
DCP 9     .250     1.198     0.333  13   0.062  28   0.077   6   0.053   8   0.063 330   0.021 343   0.017 311   0.011 269   0.036 214
DCP10     .300     0.996     0.250  20   0.036 347   0.068   8   0.061 336   0.069 321   0.029 307   0.021 286   0.016 291   0.012 265
DCP11     .395     0.775     0.122  28   0.019   6   0.013  37   0.070 286   0.009 277   0.012 249   0.006 207   0.005 267   0.008 217
DCP12     .521     0.555     0.071  53   0.025  46   0.008  56   0.005 283   0.002 163   0.003 238   0.006 209   0.003 222   0.038 176
DCP13     .600     0.411     0.056 131   0.020  58   0.009 133   0.002   5   0.002  73   0.001 286   0.006 209   0.005 158   0.004  76
DCP14     .701     0.354     0.080 130   0.026  65   0.012 136   0.005  57   0.003  25   0.002 281   0.002 165   0.006 142   0.006  58
DCP15     .800     0.160     0.065 112   0.012  12   0.008 167   0.001  75   0.001 161   0.002 162   0.003 161   0.005 167   0.006  58
DCP16     .900    -0.082     0.025  44   0.007 316   0.002 353   0.007 216   0.002 130   0.001 138   0.002  92   0.001 137   0.002 262
DCP17     .969    -0.086     0.007  41   0.005 286   0.003 305   0.002 290   0.001 293   0.002 185   0.001 222   0.003 238   0.003 193
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0        23.37      0.060        0.594        2.47        0.0         6.93        12129.1       20

                 V           Q           RN           CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP    TOP          EXT DAMP
                196.7       103977.      3.95E 07    -0.331        1.042        9.11      -0.00119     1.863        0.0
               (645.4)      (2171.6)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              6.934     2.473   0   0.080  38   0.033 237   0.019 121   0.012  11   0.013 196   0.011 157   0.020 165   0.007  66
CN                 0.051     0.364 100   0.005 126   0.012 190   0.006 166   0.005 203   0.003 190   0.003 115   0.002 178   0.002 207
CM                 0.005     0.010 105   0.008  92   0.002 169   0.000  63   0.001 336   0.000 223   0.001 330   0.001 288   0.001 175

DCP 1     .010     3.452     0.308  11   0.070  88   0.036 130   0.016 330   0.005 236   0.006 156   0.011 301   0.030 320   0.030  68
DCP 2     .020     3.569     0.306  12   0.092  88   0.011  67   0.007 132   0.003  87   0.003 186   0.001 261   0.031 315   0.006 126
DCP 3     .030     3.177     0.130 183   0.268 190   0.052  67   0.021  96   0.016  61   0.008  37   0.037   1   0.017 309   0.019 201
DCP 4     .049     2.073     0.316 177   0.271  93   0.075 188   0.066 120   0.073 201   0.020 181   0.077 166   0.036  51   0.002 206
DCP 5     .074     2.697     0.558 176   0.137  83   0.136 191   0.016 161   0.064 222   0.023 200   0.013 215   0.037 330   0.015 282
DCP 6     .099     2.562     0.627 173   0.015 292   0.096 195   0.066 261   0.020 275   0.022 252   0.020 349   0.012 290   0.020 305
DCP 7     .149     2.083     0.402 157   0.136 267   0.068 330   0.061  64   0.011  75   0.015  87   0.014 100   0.038 336   0.010 226
DCP 8     .200     1.620     0.176 172   0.087 111   0.063 165   0.013 170   0.010 212   0.013 213   0.030 282   0.007 277   0.011 218
DCP 9     .250     1.430     0.110 135   0.058  90   0.065 130   0.022 182   0.012 203   0.006 196   0.006   6   0.006 261   0.006 202
DCP10     .300     1.189     0.178  51   0.051  85   0.037 172   0.001 332   0.012 271   0.014 276   0.011  36   0.016 136   0.007  63
DCP11     .399     0.973     0.161  25   0.020  23   0.019 136   0.012  95   0.008 158   0.012 178   0.030 136   0.010 191   0.005  70
DCP12     .521     0.650     0.133  20   0.021 286   0.005 290   0.006 147   0.006 226   0.001  65   0.005 196   0.038 167   0.001 337
DCP13     .600     0.496     0.306  35   0.036 267   0.013 273   0.007 266   0.016 193   0.001 111   0.017 171   0.036 161   0.006  71
DCP14     .701     0.375     0.363  61   0.065 263   0.016 276   0.006 233   0.001 137   0.002  66   0.006 115   0.029  51   0.005 323
DCP15     .800     0.199     0.082  28   0.030 357   0.005 337   0.004 166   0.005 102   0.002  25   0.004 111   0.002  26   0.010 315
DCP16     .900    -0.026     0.309  11   0.007 270   0.000 162   0.006  58   0.006 139   0.001 138   0.006  93   0.002 330   0.003 336
DCP17     .949    -0.063     0.020   9   0.005 318   0.003 275   0.003 317   0.003 285   0.002 166   0.001 218   0.002 168   0.003  28
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                                 FORCED  PITCHING  OSCILLATION                 AIRFOIL     NLR 1

            TUNED HZ       DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.M        ALPHA.D       TEST POINT   CYCLES ANALYSED
             C.0            23.06        0.060          0.593         2.44          0.0          12.49        12131.1       20

            V               Q            RN            CN(MIN)       CN(MAX)       ALPHA,NMAX   AERO DAMP     TDR          EXT DAMP
                                          0.95E 07     -0.059         1.051         12.73       -0.00142       2.219         0.0
             196.5          103900.
            (644.7)        (2170.0)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA              12.488      2.437   0     0.365   2     0.026 199     0.019 172     0.016  76     0.019 129     0.026 202     0.021   8     0.008  88
CN                  0.977      0.272  92     0.005 133     0.008  68     0.005 206     0.003 222     0.006  63     0.024 235     0.005  31     0.004 253
CM                 -0.025      0.036 195     0.036 266     0.001 193     0.005  65     0.001  79     0.002 220     0.001 325     0.002 133     0.031 180

[illegible]                    0.095 151     0.119 136     0.033 295     [illegible] 303   0.011 198     0.026 110     0.034   3     0.008 331     0.035 114
[illegible]                    0.127 148     0.118  89     0.027 [illegible]   0.022 148     0.019 155     0.029 118     0.012 117     0.012  72     0.004 311
[illegible]         3.196      [illegible]   0.024 [illegible]   0.079 [illegible]   0.014 279     0.023 167     0.017 145     0.026  81     0.025  74     0.010  44
[illegible]         2.856      [illegible]   0.038 291     0.064 [illegible]   0.004 259     0.005 155     0.001  62     0.012 314     0.017 148     0.011 313
[illegible]                    [illegible]   [illegible]   [illegible]   0.011 297     0.015 119     0.036 [illegible]   [illegible]   0.014 115     [illegible]
[illegible]

                                                                     HARMONIC ANALYSIS

[illegible]                                                            RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

[illegible]                                                            0.025 123     0.027  41     0.013 199     [illegible]   [illegible]   0.033 347
[illegible]                                                            0.026 313     0.003   9     0.033 143     [illegible]   0.034 264     [illegible]
[illegible]                                                            0.001 293     0.002 187     0.031 263     [illegible]   0.034  87     0.032 123

DCP 1     [illegible]  [illegible]  [illegible]   [illegible]   [illegible]   0.027 266     0.015  78     0.027 213     0.019  71     [illegible] 182   0.016 130
DCP 2     [illegible]  [illegible]  0.296 165     0.021 145     0.026  91     0.031 282     0.039 213     0.019 317     0.017 136     0.018 [illegible]   0.034 177
DCP 3     [illegible]  2.067      0.331 174     0.069  33     0.068  11     0.021 227     0.033 226     0.014 293     0.020 150     0.038  71     0.037 221
DCP 4     .247       2.761      0.177 154     0.047 268     0.073   0     0.011 110     0.013 207     0.010  28     0.017 266     0.010 209     0.018  99
DCP 5     [illegible]  2.633      0.096  65     0.035 277     0.056 337     0.036 353     0.036 221     0.012  78     0.013 306     0.007 115     0.020 101
DCP 6     [illegible]  1.388      0.361  93     0.032 251     0.033 292     0.014 298     0.009 175     0.016 157     0.012 351     0.016 257     0.016 111
DCP 7     [illegible]  1.576      0.263 111     0.026 256     0.047 240     0.017 293     0.012 228     0.014 213     0.006  53     0.031 113     0.036 109
DCP 8     [illegible]  1.467      0.257  96     0.028 336     0.027 221     0.015 270     0.008 270     0.017 195     0.009  86     0.030 197     0.015 127
DCP 9     [illegible]  1.365      0.306  88     0.008 324     0.010 289     0.023 359     0.018  87     0.017 213     0.005 310     0.017  97     0.009  70
DCP10     [illegible]  1.308      0.190  87     0.013 317     0.014 269     0.020 318     0.035 335     0.015 279     0.017 323     0.008  26     0.037  58
DCP11     [illegible]  1.076      0.095  62     0.016 157     0.010 177     0.013 275     0.013  67     0.002 253     0.011 256     0.036 346     0.011  80
DCP12     [illegible]  0.891      0.091  47     0.009 141     0.005 236     0.006 317     0.010  37     0.002 136     0.007 300     0.006 170     0.036   5
DCP13     [illegible]  0.717      0.106  37     0.015 133     0.035  98     0.002 307     0.007  62     0.001 158     0.017 144     0.017 321     0.033 358
DCP14     [illegible]  0.591      0.193  24     0.017  87     0.033  32     0.009 114     0.039 347     0.036 131     0.008  92     0.012 268     0.039 340
DCP15     [illegible]  0.436      0.093  24     0.011  67     0.003  85     0.004  68     0.005 317     0.007  43     0.008 299     0.010 252     0.039 291
DCP16     [illegible]  0.151      0.257  26     0.013  56     0.035  47     0.012 138     0.005 300     0.030  73     0.013 353     0.008 256     0.029 283
DCP17     [illegible]  0.317      0.019  39     0.012  35     0.038   7     0.035 136     0.002 333     0.035 169     0.009  42     0.016 186     0.008 284
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT   CYCLES ANALYSED
            0.0        45.86       0.119       0.593       2.94        0.0         0.01       12133.1       20

          V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR          EXT DAMP
          196.7       104240.     3.95E 07    -0.029      0.405       2.78        -0.00079    1.112        0.0
          (645.3)     (2177.1)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C    RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.014    2.842   0   0.089 359   0.062 242   0.027  92   0.023  50   0.016  24   0.012 192   0.007 195   0.007 286
CN                0.176    0.276 353   0.035 334   0.032 333   0.003 357   0.001  61   0.001  96   0.002 123   0.001  44   0.001 216
CM               -0.016    0.012 302   0.001 240   0.000 354   0.001 117   0.000 297   0.000 280   0.000 283   0.000 282   0.000  62

DCP 1    .010    -0.991    1.965 339   0.166  30   0.063  81   0.027  25   0.017  65   0.006 130   0.009  87   0.004 336   0.002 292
DCP 2    .020    -0.651    1.317 345   0.047 261   0.028 336   0.008  48   0.015 286   0.025 251   0.027  62   0.021 117   0.016 184
DCP 3    .030    -0.171    1.154 344   0.033 264   0.018 305   0.015  35   0.006  48   0.006 121   0.003 124   0.002  68   0.001 161
DCP 4    .049     0.178    1.010 345   0.036 255   0.006 274   0.010  50   0.003  91   0.002  73   0.013  79   0.001 222   0.001  52
DCP 5    .074     0.344    0.862 344   0.027 258   0.009 292   0.010  60   0.003 293   0.006  93   0.003 165   0.001  70   0.003 158
DCP 6    .099     0.407    0.727 346   0.020 267   0.005 277   0.008  63   0.001 261   0.002  67   0.001 189   0.002 333   0.002 186
DCP 7    .149     0.279    0.519 346   0.009 333   0.008 291   0.006  79   0.000  69   0.003 117   0.001 104   0.003 357   0.001 254
DCP 8    .200     0.211    0.430 351   0.007 313   0.003 306   0.005 123   0.002  55   0.003 166   0.001 177   0.001  15   0.002 187
DCP 9    .250     0.207    0.368 349   0.006 331   0.004 323   0.003 360   0.001 159   0.003 221   0.001  92   0.002   6   0.000 328
DCP10    .300     0.233    0.337 349   0.013 346   0.003 315   0.002 320   0.001 333   0.002  62   0.003 101   0.001  67   0.002 180
DCP11    .399     0.177    0.243 359   0.008   7   0.002 331   0.002 333   0.003  74   0.001 179   0.002 174   0.001  25   0.002 271
DCP12    .501     0.133    0.184   2   0.006  27   0.000 283   0.003   2   0.001 129   0.003   9   0.001 121   0.001   5   0.002 209
DCP13    .600     0.147    0.135   5   0.004  39   0.001 330   0.004 323   0.002 232   0.001  58   0.002 119   0.001  89   0.002 245
DCP14    .701     0.227    0.092   9   0.003  25   0.001 278   0.003 268   0.001 199   0.002 119   0.001 170   0.001  99   0.001 183
DCP15    .800     0.189    0.049  19   0.001   1   0.001 163   0.004 301   0.002  35   0.001 226   0.003  49   0.002  91   0.002 242
DCP16    .900    -0.111    0.014  74   0.001  78   0.000 310   0.003 348   0.002 119   0.002  73   0.002  66   0.002 270   0.003 167
DCP17    .960    -0.055    0.021 179   0.002 296   0.002 222   0.008 302   0.002 306   0.001 293   0.000 217   0.002 118   0.006 344

                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT   CYCLES ANALYSED
            0.0        45.82       0.119       0.591       2.95        0.0         2.49       12133.2       20

          V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR          EXT DAMP
          195.6       103541.     3.94E 07    -0.022      0.690       5.41        -0.00079    1.255        0.0
          (641.7)     (2162.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C    RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             2.492    2.856   0   0.074 353   0.060 235   0.051  93   0.031  56   0.012  16   0.016 197   0.002  48   0.006 232
CN                0.422    0.275 351   0.008   8   0.006 296   0.001 139   0.001 123   0.000 222   0.001  75   0.001 312   0.001 127
CM               -0.038    0.014 307   0.002 219   0.000  35   0.001 138   0.000   8   0.000  65   0.001 314   0.000 243   0.000 271

DCP 1    .010     0.826    1.632 360   0.050  69   0.016 279   0.010  83   0.008  17   0.005 233   0.006  72   0.004 234   0.009 240
DCP 2    .020     0.916    1.306 344   0.036  37   0.021 315   0.008  68   0.001  70   0.006   4   0.002  43   0.003 243   0.001 242
DCP 3    .030     1.223    1.135 343   0.030  38   0.024 330   0.003  91   0.001  72   0.012  10   0.012  26   0.001 237   0.001  50
DCP 4    .049     1.287    1.100 343   0.005  17   0.037 328   0.012 160   0.002  30   0.001 213   0.002  25   0.003 249   0.003   0
DCP 5    .074     1.365    1.022 343   0.055 297   0.013 337   0.013 177   0.009  72   0.013 322   0.001 326   0.005 266   0.002 158
DCP 6    .099     1.318    0.875 344   0.131 260   0.038 128   0.006  61   0.011  97   0.009 354   0.001 302   0.003 269   0.001  50
DCP 7    .149     0.780    0.428 349   0.067  38   0.037 296   0.013 150   0.006 303   0.013 165   0.012  58   0.010 290   0.007 177
DCP 8    .200     0.650    0.308 353   0.036  36   0.016 330   0.008 140   0.002  96   0.002 349   0.001 173   0.003 345   0.001  96
DCP 9    .250     0.682    0.360 350   0.019  15   0.005 333   0.003 121   0.003 102   0.001  17   0.002 343   0.002 350   0.002 148
DCP10    .300     0.571    0.302 351   0.016  11   0.005 294   0.002 150   0.003 124   0.001  21   0.002 274   0.002 303   0.002 112
DCP11    .399     0.473    0.234   0   0.012  22   0.001 334   0.002  70   0.001 158   0.001  35   0.002 287   0.002 318   0.001  86
DCP12    .501     0.325    0.176   3   0.010  23   0.002 257   0.002 276   0.003 127   0.001   6   0.001  33   0.001  85   0.001  87
DCP13    .600     0.287    0.129   9   0.008  30   0.003 296   0.001 120   0.001 143   0.002 319   0.003 166   0.001  40   0.002  57
DCP14    .701     0.220    0.082  14   0.008  23   0.002 330   0.001 324   0.000 135   0.001 220   0.001 101   0.001  43   0.001  52
DCP15    .800     0.136    0.042  30   0.006  66   0.002 230   0.002 264   0.003 221   0.002 191   0.003  61   0.001 226   0.000 130
DCP16    .900    -0.100    0.015  67   0.006  27   0.001 257   0.005 335   0.001 168   0.002 226   0.006 158   0.001 324   0.001 212
DCP17    .960    -0.078    0.016 189   0.002 326   0.001 177   0.002 320   0.003 159   0.001 313   0.002  29   0.001  72   0.002 222
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                       FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                0.0         45.75        0.120        0.599        2.98        0.0          5.00        12133.3      20

              V            Q            RN           CM(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                                         0.96E 07    -0.015        1.001        8.03       -0.00107      1.695        0.0
              194.5        102445
             (638.2)      (2139.7)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                5.006     2.980   0    0.093   8    0.096 251    0.077 119    0.032  66    0.007  55    0.007 215    0.005 166    0.002 337
CN                   0.702     0.266 357    0.020 319    0.037 195    0.008 144    0.034  82    0.031 241    0.002 134    0.002  75    0.002   2
CM                   0.035     0.022 315    0.003 195    0.001 353    0.002 265    0.001  93    0.000 135    0.003  17    0.000 231    0.000 186

DCP 1     .010       2.301     1.294 342    0.133  36    0.047 339    0.015 218    0.006 271    0.014 156    0.007 137    0.010 174    0.006 237
DCP 2     .020       2.215     1.222 346    0.023 321    0.016 335    0.068 204    0.020 108    0.018 177    0.020  63    0.001 188    0.014  30
DCP 3     .030       2.158     1.072 345    0.035 272    0.027 143    0.046 202    0.029  97    0.012 179    0.021  60    0.034 289    0.012  29
DCP 4     .049       2.297     0.909 345    0.042  33    0.043 132    0.010 191    0.032  97    0.036 245    0.012  44    0.013 335    0.002 349
DCP 5     .074       2.276     0.905 345    0.066  42    0.018 150    0.020  22    0.017  90    0.019 329    0.007  26    0.011 301    0.003 346
DCP 6     .099       2.247     0.997 348    0.103  50    0.056 300    0.041  45    0.006 350    0.027 318    0.007 206    0.009 325    0.003 226
DCP 7     .149       1.603     0.930 352    0.198 269    0.131 291    0.191 194    0.049  91    0.050 144    0.000  73    0.023 111    0.009  19
DCP 8     .200       1.091     0.466   0    0.124 266    0.085 151    0.010  91    0.025  99    0.022   3    0.012 267    0.006 199    0.005 163
DCP 9     .250       0.937     0.347 355    0.062 248    0.069 126    0.018  39    0.016 356    0.019 293    0.014 196    0.007 122    0.006  72
DCP10     .300       0.782     0.236   1    0.021 274    0.051 114    0.064   9    0.024 259    0.007 197    0.010 165    0.013  70    0.011 333
DCP11     .395       0.634     0.174  15    0.031  26    0.006 271    0.007 107    0.002 277    0.002 219    0.004 116    0.004  55    0.003 308
DCP12     .501       0.478     0.136  20    0.026  18    0.004 252    0.007 125    0.002 218    0.001  95    0.001  61    0.002 345    0.001 256
DCP13     .600       0.394     0.102  33    0.023  16    0.006 254    0.008 121    0.002 318    0.002  65    0.001 162    0.001  73    0.001  76
DCP14     .701       0.278     0.065  55    0.023  12    0.008 249    0.008 126    0.001  51    0.000 283    0.001 157    0.000 169    0.001  80
DCP15     .800       0.163     0.043  69    0.013 355    0.006 211    0.008 111    0.002  16    0.002 256    0.002 189    0.003   5    0.001  56
DCP16     .900      -0.092     0.019  62    0.007 299    0.006 178    0.005 117    0.007 116    0.001 287    0.001 190    0.002 136    0.001   0
DCP17     .965      -0.082     0.008 180    0.007 258    0.000 199    0.007 117    0.002 223    0.001  17    0.001 167    0.003  37    0.002 343
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                       FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                0.0         45.81        0.129        0.588        2.80        0.0          7.51        12133.4      20

              V            Q            RN           CM(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                                         0.92E 07    -0.013        1.152        9.34       -0.00127      1.984        0.0
              193.7        99399.
             (635.5)      (2077.0)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                7.537     2.801   0    0.137  44    0.062 315    0.121 144    0.015  55    0.010 336    0.012 253    0.013 152    0.012 229
CN                   0.864     0.178  36    0.093  25    0.032 290    0.008 170    0.003 244    0.003 215    0.000  59    0.003 136    0.006 183
CM                   0.012     0.020 278    0.013 105    0.007   6    0.006 290    0.001  76    0.001 272    0.002 126    0.001  41    0.001 357

DCP 1     .010       3.229     0.598 353    0.179  43    0.067 170    0.011 157    0.010  60    0.022 210    0.005 280    0.013  54    0.005 219
DCP 2     .020       3.066     0.922 357    0.170  42    0.014 222    0.031  67    0.035 118    0.007 218    0.038 112    0.011 163    0.009 254
DCP 3     .030       2.889     0.737 359    0.187  42    0.060 339    0.036 101    0.051 118    0.016   8    0.036 124    0.018 158    0.004 353
DCP 4     .049       2.958     0.454 359    0.192  55    0.138 336    0.069 262    0.031 161    0.017  30    0.017  97    0.006  39    0.005  70
DCP 5     .074       2.714     0.161  16    0.349  65    0.227 337    0.095 247    0.015 156    0.019 294    0.024 152    0.018  67    0.008  37
DCP 6     .099       2.656     0.113 119    0.417  63    0.172 333    0.037 226    0.067 340    0.067 263    0.023 163    0.011 259    0.029 145
DCP 7     .149       1.957     0.417  30    0.566  57    0.063 132    0.074  50    0.063  89    0.027 335    0.019  80    0.019 201    0.032 197
DCP 8     .200       1.380     0.404  28    0.177  16    0.130 320    0.012 306    0.018 329    0.015 297    0.007 170    0.016  10    0.007 357
DCP 9     .250       1.199     0.396  22    0.145 354    0.145 301    0.040 224    0.063 286    0.026 215    0.007 246    0.014 312    0.019 232
DCP10     .300       1.011     0.320  29    0.141 338    0.112 298    0.055 331    0.066 245    0.038 198    0.038 191    0.023 205    0.019 155
DCP11     .395       0.787     0.197  42    0.077 335    0.066 241    0.018 169    0.017 232    0.026 166    0.015  88    0.013  21    0.007 284
DCP12     .501       0.574     0.151  54    0.061 339    0.036 225    0.018 138    0.008 173    0.016 135    0.015   2    0.012 269    0.013 179
DCP13     .600       0.441     0.136  76    0.051 342    0.028 233    0.017 115    0.006 110    0.010  43    0.011 205    0.006 193    0.002 186
DCP14     .701       0.336     0.112 102    0.037 355    0.019 170    0.015  80    0.002 270    0.007  30    0.010 284    0.006 196    0.006 181
DCP15     .800       0.169     0.080  86    0.033 336    0.030 168    0.014  90    0.006 352    0.006 315    0.003 272    0.002 260    0.007 186
DCP16     .900      -0.073     0.053  45    0.029 295    0.015 181    0.013 110    0.002 326    0.006 336    0.006 282    0.006 191    0.005 146
DCP17     .969      -0.081     0.017  45    0.014 290    0.005 213    0.008 139    0.002 299    0.000 123    0.003 283    0.006 153    0.003 107
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0       45.77      0.118       0.594      2.67        0.0         9.94      12135.1      20

          V          Q           RN         CM(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
          196.9      104318.     0.95E 07   -0.065      1.133        9.37      -0.00163     2.553       0.0
          (646.2)    (2179.2)
                                              HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0     RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA           9.962    2.624   0   0.096  34  0.153 171  0.019 276  0.031 345  0.009 173  0.023 175  0.005  93  0.035 316
CN              0.634    0.155 100   0.035  90  0.025 102  0.003 309  0.004 327  0.034 274  0.035 286  0.003 303  0.002  77
CM              0.005    0.036 216   0.007 106  0.037 184  0.004 107  0.002 124  0.002  57  0.001  81  0.001 330  0.031 209

DCP 1   .010    3.573    0.264  21   0.063  83  0.013  70  0.005   2  0.016 318  0.036 186  0.039 189  0.039 244  0.038 133
DCP 2   .020    3.597    0.270  23   0.123 103  0.059  94  0.035  46  0.029 354  0.011 317  0.032 262  0.011 325  0.012 256
DCP 3   .030    3.190    0.061 117   0.228  99  0.044  88  0.065 101  0.048  33  0.016   0  0.013  82  0.028  19  0.024 336
DCP 4   .049    2.913    0.336 173   0.274 100  0.066 136  0.058 112  0.035 131  0.033  83  0.033 102  0.035 125  0.010  87
DCP 5   .074    2.606    0.651 172   0.231  95  0.169 165  0.074 103  0.044 151  0.020  91  0.018 189  0.007 166  0.038 155
DCP 6   .099    2.476    0.770 167   0.089  87  0.183 166  0.014 165  0.031 173  0.022 276  0.013 190  0.024 278  0.032 177
DCP 7   .145    2.391    0.708 153   0.378 227  0.023 128  0.021 280  0.069 314  0.033 335  0.022 336  0.029 354  0.012 157
DCP 8   .200    1.507    0.331 111   0.138  94  0.080 163  0.027 100  0.010   2  0.011  78  0.015 206  0.036 270  0.030 206
DCP 9   .250    1.389    0.274  83   0.128  72  0.061 139  0.013  82  0.039 170  0.013 327  0.037 326  0.015 303  0.012 144
DCP10   .300    1.151    0.275  67   0.108  89  0.067 115  0.014 199  0.021 176  0.010 198  0.009 338  0.017 326  0.011  45
DCP11   .355    0.871    0.219  57   0.069  72  0.055  54  0.012 345  0.013  83  0.005 260  0.013 307  0.037 252  0.005  25
DCP12   .521    0.663    0.186  59   0.038  17  0.061  47  0.024 323  0.011 349  0.014 333  0.032 225  0.007 307  0.037 164
DCP13   .600    0.488    0.162  66   0.020 265  0.033  60  0.020 308  0.013 324  0.007 187  0.009 203  0.002  92  0.009 303
DCP14   .701    0.381    0.123  74   0.027 264  0.020 259  0.018 282  0.010 268  0.037 241  0.038 276  0.035 149  0.034  68
DCP15   .800    0.206    0.113  69   0.026 270  0.025 244  0.016 265  0.037 316  0.036 283  0.006 294  0.035 195  0.038  26
DCP16   .900   -0.020    0.093  33   0.015 313  0.013 325  0.005 263  0.013 295  0.037 218  0.007 178  0.036 128  0.036  85
DCP17   .965   -0.063    0.066  35   0.005  21  0.013 354  0.033 153  0.036 206  0.033 268  0.035 196  0.036 156  0.034  36

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0       45.97      0.119       0.591      2.57        0.0        12.51      12135.2      20

          V          Q           RN         CM(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
          195.7      103643.     0.95E 07   -0.075      1.118       11.58      -0.00186     2.966       0.0
          (642.4)    (2165.1)
                                              HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0     RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA          12.505    2.573   0   0.077  18  0.073 217  0.062  45  0.021  36  0.036 107  0.011 213  0.008  97  0.011   2
CN              0.980    0.160  87   0.017 192  0.007 131  0.035 285  0.003  61  0.003  54  0.033 332  0.036 260  0.001 100
CM             -0.070    0.064 217   0.006 260  0.033 263  0.001 188  0.032 216  0.032 233  0.001 122  0.031  62  0.032 299

DCP 1   .010    3.510    0.131 136   0.095  88  0.036 214  0.036 346  0.019 272  0.012 219  0.039 144  0.009 268  0.038 173
DCP 2   .020    3.531    0.190 145   0.112  89  0.040 226  0.021 185  0.039 259  0.021 193  0.033  51  0.017 231  0.031 326
DCP 3   .030    3.230    0.332 149   0.290  86  0.061 216  0.017 316  0.031 246  0.039 193  0.016 273  0.014 232  0.012 294
DCP 4   .049    2.917    0.433 170   0.089 201  0.081 198  0.058 327  0.006 223  0.027 333  0.013 229  0.012 230  0.039 246
DCP 5   .074    2.535    0.491 159   0.156 269  0.019  70  0.032 293  0.014  58  0.030   5  0.033   3  0.012 138  0.035 317
DCP 6   .099    2.307    0.333 143   0.114 263  0.022 344  0.037  66  0.022 179  0.019 287  0.037 310  0.033 189  0.015   1
DCP 7   .149    1.751    0.228 112   0.090 262  0.021 321  0.063 261  0.032 344  0.010 237  0.018 186  0.005 307  0.039  20
DCP 8   .200    1.606    0.233 139   0.167 226  0.029 219  0.017 267  0.039 352  0.015 163  0.013 283  0.032  52  0.034 236
DCP 9   .250    1.352    0.222 121   0.078 200  0.073 233  0.006 286  0.016 130  0.016 217  0.015  73  0.039 148  0.035 285
DCP10   .300    1.208    0.193 136   0.057 191  0.039 195  0.008 182  0.010 166  0.038 175  0.013 335  0.011  71  0.011  83
DCP11   .399    1.027    0.225  83   0.059 152  0.033 197  0.030 167  0.036 153  0.024 119  0.023 106  0.036 356  0.016 269
DCP12   .501    0.703    0.212  63   0.060 135  0.016 157  0.013 235  0.037  78  0.023  93  0.019  12  0.015 246  0.036 245
DCP13   .600    0.673    0.218  47   0.067 132  0.016  81  0.038 135  0.007 282  0.039 343  0.016 315  0.011 280  0.036 189
DCP14   .701    0.483    0.181  35   0.012  57  0.016  43  0.013  76  0.017  48  0.016   7  0.006 267  0.037 200  0.038 121
DCP15   .800    0.313    0.158  33   0.016 346  0.012  20  0.008 320  0.012  43  0.006  18  0.037 348  0.033 262  0.011 107
DCP16   .900    0.201    0.115  32   0.011 332  0.036   0  0.037 336  0.036   2  0.018 333  0.037 263  0.006 192  0.014  76
DCP17   .969   -0.010    0.063  32   0.013   8  0.005 147  0.010 309  0.033 191  0.034 359  0.013 284  0.011 261  0.006 182
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	45.93	0.120	0.599	2.62	0.0	14.95	12135.3	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA,NMAX	AERO DAMP	TOP	EXT DAMP
194.7 (638.8)	101832. (2126.8)	0.96E 07	-0.081	1.147	15.47	-0.00155	2.444	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.951	2.623 0	0.095 10	0.066 236	0.065 87	0.013 17	0.002 139	0.003 145	0.006 141	0.039 338
CN		1.015	0.131 68	0.012 337	0.036 94	0.038 101	0.004 220	0.034 333	0.036 96	0.033 3	0.033 328
CM		-0.047	0.036 214	0.002 298	0.031 224	0.072 274	0.009 276	0.001 158	0.002 265	0.001 195	0.000 132
DCP 1	.010	2.568	0.331 149	0.063 300	0.076 165	0.018 291	0.005 101	0.021 236	0.011 283	0.005 183	0.036 320
DCP 2	.020	2.463	0.323 163	0.037 246	0.067 193	0.032 273	0.010 67	0.016 269	0.006 159	0.009 269	0.009 66
DCP 3	.030	2.773	0.381 159	0.011 346	0.037 359	0.020 284	0.061 5	0.012 299	0.021 233	0.021 330	0.011 124
DCP 4	.045	2.726	0.274 140	0.078 263	0.079 50	0.043 122	0.013 296	0.008 55	0.018 30	0.010 68	0.013 150
DCP 5	.074	2.395	0.217 98	0.067 260	0.022 35	0.012 56	0.019 229	0.033 252	0.009 [illegible]	0.013 112	0.004 267
DCP 6	.099	2.117	0.182 103	0.078 246	0.002 228	0.017 13	0.024 212	0.007 177	0.022 [illegible]	0.038 55	0.006 156
DCP 7	.149	1.781	0.138 97	0.037 195	0.010 291	0.004 130	0.013 143	0.020 192	0.006 67	0.009 356	0.011 1
DCP 8	.200	1.566	0.150 97	0.023 158	0.012 355	0.012 171	0.003 320	0.017 262	0.008 298	0.020 39	0.006 2
DCP 9	.253	1.421	0.138 93	0.036 156	0.022 173	0.017 85	0.002 228	0.036 329	0.033 156	0.037 325	0.018 295
DCP10	.300	1.261	0.172 75	0.024 192	0.011 139	0.036 43	0.014 255	0.007 5	0.003 125	0.012 264	0.005 336
DCP11	.399	1.109	0.179 62	0.019 158	0.035 112	0.015 162	0.030 221	0.013 336	0.012 162	0.007 243	0.012 324
DCP12	.501	0.870	0.179 53	0.008 158	0.012 37	0.018 106	0.011 245	0.030 313	0.006 91	0.009 360	0.032 327
DCP13	.600	0.682	0.173 47	0.036 298	0.006 36	0.010 127	0.014 210	0.003 332	0.010 161	0.008 182	0.010 135
DCP14	.701	0.559	0.164 39	0.002 261	0.002 336	0.007 56	0.009 42	0.007 61	0.011 51	0.007 58	0.009 345
DCP15	.800	0.382	0.142 37	0.007 106	0.005 42	0.005 97	0.003 55	0.026 262	0.007 81	0.003 88	0.031 342
DCP16	.900	0.115	0.098 38	0.008 179	0.002 326	0.005 87	0.010 72	0.005 326	0.010 36	0.008 23	0.006 274
DCP17	.965	-0.007	0.044 56	0.007 196	0.002 197	0.013 82	0.005 57	0.006 330	0.009 55	0.010 335	0.002 169

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	69.62	0.177	0.594	3.16	0.0	-0.32	12137.1	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA,NMAX	AERO DAMP	TOP	EXT DAMP
197.0 (646.3)	104575. (2184.1)	0.95E 07	-0.333	0.396	3.33	-0.00067	1.387	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		-0.025	3.160 0	0.120 335	0.079 233	0.032 153	0.023 42	0.020 79	0.032 232	0.010 237	0.039 188
CN		0.124	0.268 353	0.009 288	0.004 253	0.003 219	0.001 74	0.003 65	0.001 342	0.001 60	0.001 94
CM		-0.016	0.017 293	0.001 330	0.001 90	0.001 97	0.000 290	0.000 274	0.003 141	0.000 129	0.000 267
DCP 1	.010	-0.977	1.900 335	0.137 15	0.047 101	0.012 153	0.010 15	0.005 6	0.006 346	0.009 97	0.013 129
DCP 2	.020	-0.453	1.309 342	0.078 348	0.026 280	0.013 213	0.014 296	0.028 341	0.025 41	0.026 111	0.023 182
DCP 3	.030	-0.176	1.144 341	0.057 267	0.016 270	0.003 166	0.010 46	0.034 99	0.005 203	0.003 144	0.003 259
DCP 4	.045	0.175	1.005 342	0.059 243	0.007 233	0.005 295	0.005 22	0.003 156	0.003 307	0.003 354	0.004 302
DCP 5	.074	0.319	0.854 347	0.046 246	0.017 234	0.006 173	0.012 345	0.004 26	0.002 174	0.004 70	0.003 268
DCP 6	.099	0.401	0.723 344	0.035 251	0.005 223	0.005 201	0.003 23	0.004 357	0.001 151	0.001 127	0.003 273
DCP 7	.149	0.278	0.512 346	0.019 283	0.008 242	0.006 182	0.001 242	0.004 36	0.002 253	0.001 352	0.004 271
DCP 8	.200	0.212	0.425 353	0.017 270	0.003 268	0.007 211	0.001 356	0.005 71	0.005 3	0.003 78	0.003 15
DCP 9	.250	0.232	0.362 357	0.013 281	0.010 259	0.007 294	0.001 88	0.005 24	0.002 30	0.001 111	0.002 102
DCP10	.300	0.197	0.303 352	0.011 296	0.008 237	0.006 196	0.002 130	0.003 3	0.001 271	0.001 142	0.002 36
DCP11	.399	0.177	0.239 5	0.009 322	0.007 296	0.005 214	0.001 136	0.003 47	0.003 249	0.003 20	0.004 92
DCP12	.501	0.131	0.183 10	0.007 353	0.006 308	0.001 270	0.005 110	0.005 86	0.003 337	0.003 115	0.001 253
DCP13	.600	0.144	0.135 18	0.006 358	0.004 216	0.002 237	0.001 142	0.005 68	0.001 333	0.003 265	0.002 122
DCP14	.701	0.223	0.093 26	0.005 349	0.003 271	0.004 263	0.003 75	0.002 51	0.001 36	0.002 335	0.003 64
DCP15	.800	0.085	0.056 42	0.005 10	0.001 170	0.002 255	0.002 53	0.002 96	0.002 341	0.003 289	0.004 88
DCP16	.900	-0.112	0.019 98	0.004 128	0.003 266	0.006 302	0.002 244	0.001 237	0.003 268	0.001 161	0.004 279
DCP17	.969	-0.056	0.023 167	0.002 216	0.003 237	0.001 164	0.003 69	0.002 264	0.002 29	0.002 27	0.005 122

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                              FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

                 TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         69.00      0.179         0.592        3.14        0.0          2.44        12137.2        20

                 V           Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOP          EXT DAMP
                 196.2       104073.      0.95E 07     -0.026        0.689        5.80       -0.00072     1.152         0.0
                 (643.8)     (2173.6)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                  2.441      3.139   0    0.098 310    0.116 193    0.015  76    0.006 317    0.010 130    0.003 156    0.006 180    0.008 129
CN                     0.427      0.265 353    0.008 324    0.007 246    0.001 165    0.002 144    0.001 347    0.001  41    0.002 316    0.001  79
CM                    -0.008      0.020 300    0.003 195    0.001  81    0.000 219    0.000   1    0.000 141    0.001  29    0.000 141    0.000 267

DCP 1       .010       0.775      1.572 335    0.011 198    0.026 167    0.029 251    0.027  36    0.039 256    0.039 157    0.006  17    0.035 233
DCP 2       .020       0.919      1.294 342    0.007  79    0.023 255    0.004 263    0.005  95    0.001 133    0.001 189    0.001 133    0.002 327
DCP 3       .030       1.014      1.121 341    0.016  41    0.020 269    0.007 201    0.004  57    0.000 279    0.002 246    0.012  93    0.013 302
DCP 4       .049       1.281      1.001 341    0.019 233    0.028 270    0.016 181    0.017  44    0.005 197    0.003 341    0.003 218    0.006 331
DCP 5       .074       1.135      1.011 341    0.077 222    0.002 193    0.015 190    0.014  59    0.011 294    0.003 167    0.013 285    0.003 151
DCP 6       .099       1.108      0.966 343    0.150 271    0.069 126    0.006 317    0.013 131    0.019 333    0.022 230    0.002 353    0.007  67
DCP 7       .145       0.783      0.625 349    0.067  76    0.003 270    0.010 162    0.008 212    0.015 139    0.013  73    0.008 269    0.006 131
DCP 8       .200       0.667      0.391 356    0.028  20    0.019 266    0.006 173    0.001 113    0.001 167    0.003 275    0.001 331    0.001  69
DCP 9       .250       0.580      0.342 352    0.017 345    0.011 269    0.003 156    0.002  43    0.001 327    0.001  69    0.000 320    0.003 226
DCP10       .300       0.519      0.286 354    0.016 335    0.009 231    0.002 188    0.002 212    0.000 130    0.001 346    0.003 292    0.002 327
DCP11       .355       0.432      0.227   7    0.012 358    0.006 252    0.002  31    0.002 195    0.001 326    0.002  52    0.002  13    0.005  73
DCP12       .501       0.323      0.172  13    0.017 345    0.006 276    0.001 305    0.004 163    0.003 337    0.001 272    0.003  23    0.013  36
DCP13       .600       0.285      0.129  21    0.012 356    0.008 261    0.002  95    0.003 191    0.001  32    0.002  89    0.003 317    0.001  89
DCP14       .701       0.318      0.096  33    0.014 359    0.008 239    0.002 105    0.001 173    0.003 358    0.001  98    0.001 255    0.001 137
DCP15       .800       0.136      0.069  53    0.010  19    0.006 276    0.002  22    0.002 123    0.002 186    0.001 251    0.002 272    0.003 113
DCP16       .900      -0.102      0.016  88    0.008 353    0.005 236    0.001  56    0.001 124    0.006 265    0.007 277    0.003 346    0.002  27
DCP17       .969      -0.072      0.021 180    0.005  43    0.001 298    0.001 263    0.003 163    0.002  67    0.001 137    0.002 216    0.002 206

                              FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

                 TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         68.85      0.179         0.591        3.15        0.0          4.94        12137.3        20

                 V           Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOP          EXT DAMP
                 195.6        103699.     0.95E 07     -0.033        0.993        8.25       -0.00005     1.533         0.0
                 (641.8)     (2165.8)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                  4.939      3.151   0    0.132 350    0.166 176    0.016  85    0.005  38    0.013 136    0.011 328    0.009 142    0.006 249
CN                     0.698      0.267 359    0.020 287    0.016 169    0.003  28    0.003 148    0.002 160    0.003 356    0.001  56    0.002 282
CM                     0.035      0.027 333    0.003 164    0.000  73    0.002 175    0.001  33    0.001 331    0.001 126    0.000 311    0.001  70

DCP 1       .010       2.237      1.306 335    0.110  37    0.036 267    0.026 161    0.006 137    0.016 138    0.006 157    0.011  68    0.006 280
DCP 2       .020       2.226      1.227 343    0.008 195    0.022 147    0.065 190    0.022  78    0.021 147    0.022  26    0.003 217    0.015 330
DCP 3       .030       2.143      1.277 341    0.031 218    0.037 147    0.063 186    0.032  73    0.016 141    0.001  73    0.008 336    0.011 332
DCP 4       .049       2.276      0.919 341    0.037  59    0.062 133    0.003 196    0.031  67    0.005 272    0.013 345    0.010 272    0.003 358
DCP 5       .074       2.264      0.914 341    0.063  55    0.037 168    0.026 356    0.017  73    0.019 285    0.037 353    0.037 336    0.005 302
DCP 6       .099       2.232      0.997 343    0.099  53    0.352 258    0.352  38    0.008 301    0.018 286    0.013 126    0.007 297    0.006 147
DCP 7       .149       1.570      0.924 351    0.247 269    0.122 236    0.166 164    0.056  46    0.065 169    0.027  78    0.026  29    0.019 263
DCP 8       .200       1.096      0.682   3    0.135 253    0.136 142    0.327  36    0.039  67    0.011 236    0.020 236    0.012 165    0.010  81
DCP 9       .250       0.928      0.351 356    0.068 222    0.076 133    0.351 348    0.019 246    0.013 196    0.006 125    0.033 121    0.005  21
DCP10       .300       0.776      0.267   4    0.022 326    0.055  37    0.061 319    0.066 195    0.026  86    0.016 322    0.037 310    0.013  76
DCP11       .355       0.635      0.189  23    0.026  21    0.009 262    0.006 337    0.008 181    0.002  23    0.003 278    0.002   8    0.031 205
DCP12       .501       0.476      0.155  37    0.021 358    0.010 261    0.003  21    0.003 189    0.002 331    0.003 323    0.001 197    0.001 280
DCP13       .600       0.392      0.121  42    0.018 351    0.038 226    0.007  37    0.006 237    0.003 329    0.006 311    0.002 169    0.002 321
DCP14       .701       0.376      0.091  66    0.024 346    0.013 211    0.007  56    0.001 152    0.002   6    0.003 323    0.001 125    0.002 227
DCP15       .800       0.163      0.066  73    0.016 319    0.006 137    0.026  33    0.004 215    0.003  19    0.005 355    0.002 162    0.002 186
DCP16       .900      -0.093      0.026  78    0.010 273    0.033 155    0.006 347    0.035 169    0.031 346    0.033 333    0.033  61    0.006 278
DCP17       .969      -0.083      0.008 183    0.026 227    0.002  66    0.001 251    0.032 345    0.002  69    0.002 159    0.001 335    0.032 232
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

           TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0        69.96       0.180       0.590       3.04        0.0         7.46       12137.4      20

           V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
            195.0       103321.     0.95E 07   -0.039       1.728       10.23      -0.00087     1.386       0.0
           (639.7)     (2157.9)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.457    3.036   0   0.332  27   0.178 166   0.046 136   0.013 351   0.013  27   0.008 196   0.006 206   0.013 244
CN                  0.944    0.277  36   0.085 324   0.029 211   0.003 142   0.003 119   0.003  96   0.002 184   0.004  46   0.003 261
CM                  0.039    0.025 257   0.021  76   0.011 339   0.003 183   0.001 207   0.001  90   0.001 329   0.001 184   0.001  48

DCP 1    .010       3.023    0.777 349   0.157  51   0.035 167   0.006 142   0.009 121   0.008 281   0.013  52   0.004 219   0.011 167
DCP 2    .020       2.971    0.937 358   0.099  59   0.032 320   0.033  79   0.010 118   0.023  40   0.017 129   0.005 261   0.010 132
DCP 3    .030       2.817    0.856 357   0.092  46   0.078 308   0.034 123   0.027  71   0.034   5   0.019 162   0.004  73   0.010 115
DCP 4    .049       2.775    0.513   4   0.177  40   0.154 305   0.075 203   0.014 103   0.028  44   0.018  11   0.018 321   0.008 180
DCP 5    .074       2.635    0.312  33   0.339  33   0.209 283   0.089 173   0.030 306   0.033 144   0.034  27   0.021 293   0.001 179
DCP 6    .099       2.563    0.307  72   0.430  33   0.160 263   0.025 178   0.075 280   0.049 147   0.009   3   0.024 125   0.029 352
DCP 7    .149       1.797    0.780  43   0.378  32   0.042  31   0.090  25   0.015 147   0.026 226   0.016 269   0.025  95   0.028  73
DCP 8    .200       1.361    0.604  31   0.216 325   0.068 290   0.036 291   0.017 220   0.002 313   0.018 227   0.002 306   0.023 255
DCP 9    .250       1.188    0.518  22   0.227 297   0.136 243   0.063 216   0.034 170   0.019 107   0.011 185   0.017  57   0.014 273
DCP10    .300       1.021    0.431  22   0.209 288   0.113 220   0.048 184   0.043 137   0.032  90   0.015  58   0.016  23   0.011 317
DCP11    .399       0.793    0.306  39   0.149 288   0.094 187   0.031 113   0.027  89   0.028  74   0.018 296   0.011 195   0.007 133
DCP12    .531       0.576    0.263  46   0.101 280   0.060 161   0.018  54   0.014  47   0.015 321   0.012 207   0.009  74   0.010 283
DCP13    .600       0.463    0.203  62   0.083 287   0.051 150   0.020  16   0.006  11   0.009 301   0.011 105   0.007  58   0.006 254
DCP14    .701       0.378    0.167  79   0.060 284   0.040 117   0.022 343   0.004 307   0.008 230   0.011 113   0.010 345   0.008 223
DCP15    .800       0.172    0.117  67   0.054 265   0.030 105   0.011 337   0.010 338   0.012 205   0.009  85   0.005 327   0.003 224
DCP16    .900      -0.073    0.070  30   0.042 242   0.021  85   0.003 336   0.005 282   0.003 121   0.001 171   0.002 342   0.005 179
DCP17    .965      -0.085    0.025  36   0.070 256   0.011  99   0.001 199   0.003  20   0.004 199   0.003 173   0.038  13   0.037 228


                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

           TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
             0.0        69.67       0.177       0.597       2.91        0.0         9.96       12139.1      20

           V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
            196.9       104379.     0.95E 07   -0.079       1.277       11.56      -0.00139     2.236       0.0
           (646.0)     (2180.0)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               9.962    2.907   0   0.233  63   0.053 298   0.017 175   0.012  40   0.016 253   0.016 205   0.016 171   0.033 308
CN                  0.961    0.258  75   0.062  32   0.027  42   0.009 306   0.007 177   0.003 193   0.005 149   0.004 146   0.004  71
CM                  0.000    0.050 319   0.016 111   0.009 131   0.007  76   0.004  16   0.001   4   0.000 343   0.001 334   0.001 216

DCP 1    .010       3.429    0.265  27   0.139  58   0.042 355   0.026 324   0.009 332   0.017 236   0.006 342   0.017 189   0.002 274
DCP 2    .020       3.407    0.703  30   0.175  75   0.065  20   0.017 330   0.019 332   0.020 245   0.009 154   0.035 282   0.036 237
DCP 3    .030       3.151    0.175  52   0.271  78   0.098   5   0.037 131   0.061  79   0.036 311   0.021 244   0.036 159   0.011 279
DCP 4    .049       2.975    0.369 146   0.318  80   0.032 121   0.109  88   0.065  27   0.030  48   0.017 353   0.021  37   0.025 332
DCP 5    .074       2.668    0.524 149   0.335  67   0.131 145   0.120  61   0.038 157   0.063  62   0.004 268   0.033  61   0.016 338
DCP 6    .099       2.518    0.712 147   0.261  55   0.160 142   0.055  57   0.060 138   0.026  67   0.039 121   0.016  16   0.019 136
DCP 7    .145       2.126    0.778 129   0.079 105   0.142  99   0.037 181   0.012 156   0.027 192   0.017 183   0.021 187   0.014 172
DCP 8    .200       1.555    0.533  82   0.193  80   0.116  91   0.037 311   0.009 197   0.031 226   0.029 114   0.018 349   0.008 279
DCP 9    .253       1.350    0.488  63   0.189  50   0.097  56   0.010  42   0.008  38   0.008 225   0.013 137   0.002 189   0.015 132
DCP10    .300       1.131    0.466  50   0.159  78   0.096  41   0.022  27   0.024 101   0.018 158   0.039 159   0.037 165   0.024 108
DCP11    .399       0.888    0.369  56   0.097   7   0.083  16   0.049 335   0.019 325   0.011  12   0.007 356   0.035 313   0.011  66
DCP12    .501       0.667    0.331  54   0.063 332   0.043 352   0.032 339   0.022 276   0.014 232   0.016 266   0.012 173   0.013 351
DCP13    .600       0.538    0.262  60   0.063 319   0.037 332   0.040 269   0.029 236   0.017 229   0.011 125   0.003 227   0.030 112
DCP14    .701       0.411    0.233  55   0.056 285   0.029 298   0.029 266   0.023 197   0.016 189   0.011 157   0.012 135   0.009  38
DCP15    .800       0.221    0.182  50   0.056 290   0.030 285   0.028 227   0.021 165   0.006  44   0.006 117   0.005 137   0.005  22
DCP16    .900      -0.019    0.133  28   0.063 290   0.028 281   0.016 239   0.019 162   0.010 176   0.007   6   0.006 150   0.008 269
DCP17    .969      -0.066    0.060  38   0.021 358   0.022 331   0.011 263   0.009 190   0.017  44   0.004 262   0.006  52   0.006  68
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                                FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

                  TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0          68.84       0.179         0.589        2.88        0.0          12.50       12139.2       20

                  V             Q             RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                  195.4         103364.     0.95E 07     -0.095        1.266       12.56       -0.00155      2.479        0.0
                 (641.0)       (2158.8)
                                                                  HARMONIC ANALYSIS
DATA
TYPE        X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               12.504     2.875   0    0.023 336    0.016 130    0.043  86    0.019 353    0.010 141    0.011 134    0.010 155    0.007 318
CN                   0.988     0.221  78    0.027 109    0.015  86    0.007 112    0.001 186    0.006 137    0.002 355    0.002 280    0.003 102
CM                  -0.028     0.058 215    0.008 228    0.007 190    0.002 260    0.001 311    0.003 266    0.001  98    0.001 306    0.002 307

DCP 1      .010      3.502     0.098 124    0.091  55    0.033 162    0.010  58    0.015 163    0.007 266    0.011 197    0.003  82    0.006  43
DCP 2      .020      3.534     0.166 123    0.170  85    0.026 172    0.045 107    0.005  59    0.015 145    0.013  69    0.003  77    0.009  34
DCP 3      .030      3.262     0.311 151    0.190  79    0.067 175    0.042  69    0.031 221    0.021 135    0.007  41    0.006  46    0.011 292
DCP 4      .049      2.933     0.471 154    0.034  15    0.118 170    0.038 294    0.061 198    0.033 317    0.016 189    0.021 338    0.011 352
DCP 5      .074      2.669     0.559 168    0.092 265    0.073 138    0.055 264    0.095  47    0.026 296    0.021  57    0.014 294    0.016 354
DCP 6      .099      2.416     0.490 136    0.130 263    0.076  77    0.008 206    0.019 316    0.038 354    0.026 116    0.034 200    0.038 309
DCP 7      .149      1.793     0.328  94    0.095 192    0.033  96    0.018 232    0.018 344    0.029 223    0.015  11    0.012 247    0.006 309
DCP 8      .200      1.411     0.260 108    0.058 166    0.028 273    0.025 155    0.015 197    0.036 292    0.018 129    0.019   7    0.010 270
DCP 9      .250      1.393     0.315 106    0.069 158    0.013 180    0.033 166    0.012 141    0.021 223    0.013  39    0.016 313    0.035 152
DCP10      .300      1.238     0.315  93    0.089 145    0.036 154    0.009 110    0.006 290    0.033 125    0.021   9    0.017 315    0.038 136
DCP11      .399      1.055     0.352  76    0.090 110    0.050 126    0.022 121    0.026  62    0.025 201    0.025 277    0.016 229    0.012  65
DCP12      .501      0.899     0.334  57    0.055  88    0.047  66    0.037  99    0.031 319    0.032 131    0.006 123    0.033  29    0.010 264
DCP13      .600      0.621     0.276  49    0.059  61    0.036  32    0.016  42    0.023 232    0.027 135    0.003 224    0.008 214    0.013  65
DCP14      .701      0.497     0.253  39    0.027  42    0.036  11    0.013 145    0.026 142    0.020  56    0.038 236    0.012 165    0.010 113
DCP15      .800      0.339     0.217  36    0.034  18    0.027 345    0.007  38    0.034 163    0.008  71    0.035 139    0.011 151    0.014 153
DCP16      .900      0.084     0.158  31    0.024  17    0.026 347    0.011 339    0.014  73    0.015  75    0.002 355    0.005  63    0.008 111
DCP17      .969     -0.009     0.075  46    0.078  17    0.014 347    0.015 240    0.039 174    0.013  36    0.015 333    0.021  56    0.012 169

                                FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

                  TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0          68.92       0.180         0.597        2.91        0.0          14.96       12139.3       20

                  V             Q             RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                  194.5         102823.     0.95E 07     -0.102        1.191       14.18       -0.00141      2.247        0.0
                 (638.2)       (2147.5)
                                                                  HARMONIC ANALYSIS
DATA
TYPE        X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               14.962     2.907   0    0.095 290    0.097 185    0.033 102    0.026   1    0.015 219    0.039 184    0.015 104    0.011 341
CN                   1.009     0.182  68    0.022 121    0.021 209    0.037 108    0.003 196    0.032 161    0.001 180    0.003 255    0.007 350
CM                  -0.068     0.050 217    0.010 236    0.007 359    0.003 317    0.002   4    0.001  13    0.001  67    0.001 123    0.033 166

DCP 1      .013      3.489     0.298 152    0.050 209    0.071 145    0.021 304    0.026 333    0.019 222    0.010 231    0.016 198    0.007 137
DCP 2      .020      3.474     0.354 152    0.037 230    0.067 191    0.076 259    0.020  18    0.037 278    0.025 323    0.014 264    0.017 159
DCP 3      .030      2.998     0.490 156    0.091 270    0.031 321    0.018  49    0.021 321    0.036 114    0.019 258    0.015 196    0.030 162
DCP 4      .049      2.756     0.310 163    0.128 256    0.065  13    0.033 106    0.033 335    0.016  55    0.032 165    0.010 209    0.014 272
DCP 5      .074      2.406     0.225 110    0.135 226    0.056 340    0.036  78    0.012 357    0.010 353    0.019  72    0.019 106    0.013 285
DCP 6      .099      2.081     0.207 114    0.083 191    0.028 339    0.024  83    0.016 297    0.010 257    0.016 126    0.026 170    0.011 335
DCP 7      .149      1.725     0.188  98    0.087 164    0.042 282    0.004  33    0.030 116    0.006  41    0.029  86    0.010   0    0.010 308
DCP 8      .200      1.516     0.203  96    0.066 196    0.031 235    0.035 352    0.017  13    0.018 188    0.014  86    0.013 213    0.015  13
DCP 9      .250      1.413     0.239  96    0.066 148    0.025 241    0.010 342    0.017  72    0.013 139    0.012 136    0.016 135    0.008 115
DCP10      .300      1.255     0.243  75    0.039 115    0.051 222    0.011 291    0.024 288    0.001 322    0.015 319    0.005  45    0.006 282
DCP11      .398      1.091     0.268  66    0.063 111    0.042 216    0.036 257    0.013 251    0.008 338    0.015 272    0.017  22    0.017  83
DCP12      .501      0.870     0.262  52    0.053  88    0.042 186    0.025 140    0.023 153    0.014  73    0.013 202    0.016   4    0.014  56
DCP13      .600      0.685     0.235  43    0.042  75    0.036 197    0.021 150    0.014 161    0.003  96    0.005  51    0.026 302    0.033   2
DCP14      .701      0.564     0.220  40    0.035  46    0.022 176    0.017  97    0.007 158    0.035 223    0.001 223    0.015 236    0.010 321
DCP15      .800      0.391     0.205  39    0.030  40    0.025 175    0.012 104    0.009 196    0.015 236    0.011 247    0.010 194    0.013 216
DCP16      .900      0.122     0.145  41    0.029  16    0.016 151    0.010 151    0.005 255    0.006 235    0.004 207    0.011 105    0.007 279
DCP17      .969     -0.003     0.069  52    0.010  77    0.039 190    0.032 289    0.003 325    0.013 149    0.002  81    0.005 300    0.008 329
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                        FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0         23.09        0.052        0.686        2.66         0.0          -0.02       12141.1       20

               V           Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDP          EXT DAMP
               225.2        129133.      0.10E 08    -0.033        0.480        2.68        -0.00100      1.784        0.0
              (738.7)      (2697.0)
                                                             HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               -0.018    2.658   0   0.061  10   0.056 201   0.030 123   0.027  26   0.009  77   0.013 186   0.028 194   0.015 349
CN                   0.149    0.337 351   0.005 296   0.003 136   0.002  74   0.001 285   0.002 222   0.001 225   0.001 196   0.001 356
CM                  -0.018    0.013 329   0.001 352   0.001 144   0.000 220   0.000  53   0.000  79   0.000 134   0.001  40   0.000 141

DCP 1     .010      -1.315    1.780 346   0.351  25   0.139 312   0.067  13   0.009 103   0.032  16   0.026  88   0.011 118   0.019  31
DCP 2     .020      -0.749    1.606 347   0.143  52   0.021 348   0.047  32   0.050 107   0.022 176   0.015 105   0.029 148   0.015 279
DCP 3     .030      -0.456    1.461 347   0.214  56   0.063 127   0.033 108   0.052 112   0.053 185   0.020 255   0.018 149   0.036 237
DCP 4     .049       0.028    1.252 347   0.144  56   0.139 131   0.130 209   0.071 282   0.023 353   0.022 251   0.050 334   0.058  62
DCP 5     .074       0.385    0.882 348   0.039 248   0.064 319   0.010  13   0.008 311   0.004 345   0.010  72   0.017 138   0.010 21
DCP 6     .099       0.534    0.900 348   0.056 247   0.062 321   0.010 246   0.010  91   0.015 198   0.007 111   0.005 124   0.007  65
DCP 7     .149       0.451    0.840 348   0.165 245   0.054 133   0.015 264   0.055 117   0.044   7   0.015 222   0.026   5   0.032 241
DCP 8     .200       0.293    0.615 351   0.118 250   0.108 144   0.105  40   0.080 298   0.049 191   0.009  86   0.023 161   0.032  68
DCP 9     .250       0.204    0.381 352   0.066  48   0.032 309   0.013 203   0.004  72   0.002 184   0.001  68   0.002 241   0.002   2
DCP10     .300       0.211    0.337 351   0.025  45   0.017 305   0.006 209   0.003  75   0.002 274   0.001 241   0.001 191   0.002 345
DCP11     .399       0.192    0.280 355   0.011  48   0.005 310   0.003 227   0.002 105   0.002 193   0.001 317   0.004 226   0.002 357
DCP12     .501       0.167    0.213 356   0.006  46   0.004 315   0.002 242   0.001  74   0.002 257   0.000 165   0.001 196   0.001 330
DCP13     .600       0.162    0.149 358   0.003  51   0.003 345   0.001 342   0.000 131   0.001 220   0.001 298   0.003 203   0.002   6
DCP14     .701       0.252    0.096   0   0.006  67   0.002 338   0.001  26   0.002 218   0.001 207   0.002 272   0.002 317   0.002 323
DCP15     .800       0.088    0.039   9   0.001 161   0.001 359   0.002  34   0.002 224   0.002 276   0.002 300   0.004 235   0.001 302
DCP16     .900      -0.127    0.010 147   0.007 234   0.002  34   0.002  40   0.002 221   0.003 296   0.002 296   0.005 207   0.002 327
DCP17     .969      -0.257    0.029 176   0.005 212   0.001  62   0.001  29   0.002 240   0.001 215   0.001 352   0.002 246   0.002 293


                        FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0         23.13        0.053        0.684        2.66         0.0           2.43       12141.2       20

               V           Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDP          EXT DAMP
               224.3        128659.      0.10E 08    -0.019        0.942        5.22        -0.00124      2.238        0.0
              (735.8)      (2687.1)
                                                             HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                2.431    2.657   0   0.076  22   0.061 231   0.039 111   0.076  40   0.009  36   0.027 206   0.014 162   0.010 344
CN                   0.677    0.336 352   0.020 335   0.014 232   0.010 119   0.004   3   0.001 347   0.001 276   0.001 324   0.001  18
CM                  -0.006    0.013 320   0.002 149   0.002  39   0.001 303   0.000 216   0.000  28   0.000  62   0.000 320   0.000  68

DCP 1     .010       0.494    1.289 345   0.116  36   0.061 178   0.010 293   0.006 279   0.000  19   0.005 311   0.007 275   0.004 151
DCP 2     .020       0.619    1.380 348   0.105  45   0.019 170   0.006  22   0.004 169   0.002  89   0.003 179   0.008 308   0.001  13
DCP 3     .030       0.739    0.905 348   0.100  49   0.014 172   0.008  21   0.003 161   0.002  93   0.002 141   0.006 308   0.001 322
DCP 4     .049       1.058    0.920 348   0.105  50   0.011 183   0.010  24   0.004 135   0.001  76   0.003 114   0.006 299   0.002  10
DCP 5     .074       1.205    0.741 348   0.082  46   0.013 166   0.006 226   0.004 275   0.003 162   0.004 217   0.005 301   0.001 261
DCP 6     .099       1.361    0.750 348   0.109  51   0.028 156   0.005   5   0.012 113   0.010 178   0.002 243   0.002 260   0.005 228
DCP 7     .149       1.229    0.871 347   0.120  56   0.061 300   0.078  33   0.014 163   0.045 354   0.037  83   0.013 283   0.030  39
DCP 8     .200       1.089    0.976 349   0.015  38   0.140 316   0.015  82   0.089 288   0.023  27   0.058 257   0.033 344   0.038 223
DCP 9     .250       0.971    0.997 348   0.166 242   0.098 218   0.131 208   0.019 310   0.092 178   0.018  62   0.055 148   0.031  40
DCP10     .300       0.711    0.609 356   0.031 271   0.124 189   0.091 152   0.082  72   0.025 332   0.011  35   0.008 280   0.035 338
DCP11     .399       0.459    0.277   1   0.069 273   0.089 153   0.051  49   0.005   3   0.018  13   0.016 277   0.008 204   0.002 167
DCP12     .501       0.306    0.123   9   0.038  41   0.010 163   0.019  42   0.015 296   0.008 193   0.006 113   0.002 350   0.001 139
DCP13     .600       0.268    0.081  16   0.045  51   0.014 305   0.003 211   0.003 187   0.001 162   0.001 203   0.001  51   0.000   8
DCP14     .701       0.317    0.068  75   0.032  48   0.013 296   0.005 187   0.002  96   0.001 324   0.002 224   0.000  92   0.000  36
DCP15     .800       0.120    0.031  23   0.011  38   0.008 278   0.005 149   0.001 355   0.001 225   0.001 163   0.001 194   0.001 320
DCP16     .900      -0.125    0.010  19   0.004 342   0.008 269   0.003 152   0.001 150   0.001 219   0.001 260   0.002 125   0.002 226
DCP17     .969      -0.078    0.013 188   0.002 280   0.005 281   0.003 154   0.002 344   0.002 140   0.001 161   0.001  84   0.001 335
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                    0.0        23.11        0.053        0.684        2.60        0.0           4.96       12141.3       20

                  V           Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                                            0.10E 08    -0.024        0.981        6.67       -0.00297      3.604        0.0
                   223.7       128338.
                  (733.9)     (2680.4)                                     HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 4.963     2.595   0    0.072  39    0.064 236    0.059  97    0.054  29    0.035 279    0.041 177    0.039 190    0.020  70
CN                    0.727     0.294  11    0.066  38    0.021  39    0.014 331    0.007 279    0.001 258    0.004 221    0.004 130    0.036  52
CM                    0.007     0.014 286    0.005 172    0.003 157    0.003 112    0.003  36    0.002 321    0.001 312    0.002 274    0.001 222

DCP 1      .010       1.561     0.824 356    0.120  23    0.031  25    0.011 236    0.005 180    0.011 294    0.008 264    0.004  13    0.010 349
DCP 2      .020       1.509     0.722 358    0.087   6    0.002 262    0.016 248    0.017 164    0.005 351    0.004 240    0.007  99    0.007   8
DCP 3      .030       1.492     0.610 358    0.076 353    0.011 208    0.014 233    0.016 161    0.005  19    0.002 236    0.006  89    0.038  10
DCP 4      .049       1.699     0.468 359    0.069  20    0.005 174    0.008 199    0.008 131    0.006 250    0.002 306    0.031  47    0.005   6
DCP 5      .074       1.781     0.431 358    0.069  28    0.005 194    0.008 212    0.005 134    0.006 331    0.002 328    0.001   3    0.004  13
DCP 6      .099       1.905     0.396 358    0.067  36    0.009  38    0.005 235    0.004 127    0.006 330    0.002 273    0.009  30    0.003  19
DCP 7      .149       1.889     0.366 357    0.062  34    0.012  24    0.006 267    0.004 153    0.005 319    0.001 290    0.000  40    0.032   7
DCP 8      .200       1.808     0.363 359    0.079  47    0.022  60    0.013 273    0.010 256    0.006 296    0.003 139    0.004  99    0.004  92
DCP 9      .250       1.453     0.328 352    0.454  60    0.147 115    0.020 193    0.080 296    0.037 215    0.065 250    0.025 227    0.029  61
DCP10      .300       1.337     0.467  15    0.260  61    0.134  61    0.128  31    0.080  48    0.031   4    0.017 351    0.006 207    0.009 199
DCP11      .399       0.721     0.358  11    0.017 356    0.089 359    0.046   7    0.041 322    0.020 347    0.008 295    0.005 123    0.014  46
DCP12      .501       0.693     0.210  27    0.063 316    0.044 352    0.052 295    0.035 264    0.022 292    0.021 226    0.017 182    0.007 112
DCP13      .600       0.348     0.395  57    0.066 343    0.020 293    0.031 265    0.027 216    0.018 196    0.022 166    0.019 124    0.016  91
DCP14      .701       0.318     0.073 128    0.028  30    0.007 214    0.011 249    0.021 187    0.018 120    0.012  96    0.013  62    0.011  17
DCP15      .800       0.122     0.044 114    0.025  25    0.003 263    0.006 244    0.013 190    0.010 115    0.008  80    0.007  43    0.006 337
DCP16      .900      -0.118     0.026  70    0.022 348    0.005 297    0.010 248    0.013 174    0.010 116    0.007  72    0.006  31    0.003 299
DCP17      .969      -0.091     0.015 139    0.010 351    0.003 129    0.004 296    0.002 143    0.002  39    0.002 187    0.004 114    0.002 271
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                    0.0        22.45        0.051        0.686        2.47        0.0           7.42       12143.1       20

                  V           Q            RN           CM(MIN)      CN(MAX)     ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                                            0.10E 08    -0.017        1.009        9.64       -0.00185      3.318        0.0
                   225.3       129267.
                  (739.3)     (2699.8)                                     HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 7.423     2.475   0    0.096  28    0.041 220    0.018  83    0.017 328    0.007 101    0.014 310    0.021 270    0.014 344
CN                    0.882     0.117  31    0.022 136    0.007 273    0.010 219    0.007 139    0.002  55    0.003 342    0.003 334    0.004 354
CM                   -0.001     0.013 236    0.003  24    0.001  33    0.002 325    0.002 331    0.001 272    0.000 168    0.001 118    0.001 138

DCP 1      .010       2.147     0.576 358    0.078  84    0.008  27    0.009 108    0.019   0    0.004  74    0.010 251    0.007  40    0.005 324
DCP 2      .020       2.086     0.577   2    0.040  76    0.018  16    0.013 115    0.011  22    0.005  79    0.004 312    0.004  73    0.003  61
DCP 3      .030       2.000     0.541   2    0.025  71    0.024   8    0.011 116    0.013  13    0.006  71    0.006 322    0.004 105    0.003  48
DCP 4      .049       2.095     0.400   3    0.007  24    0.010  12    0.004 202    0.010   6    0.002   0    0.006 334    0.003  97    0.004  30
DCP 5      .074       2.134     0.346   3    0.007  23    0.002  28    0.004 194    0.007  15    0.001 326    0.005 333    0.002  86    0.002   7
DCP 6      .099       2.223     0.292   4    0.011  46    0.001 240    0.009 223    0.005  61    0.003 332    0.004 311    0.002  95    0.002  18
DCP 7      .149       2.129     0.197   8    0.064  72    0.031 331    0.028 227    0.016 126    0.007  34    0.004 314    0.003  10    0.004 283
DCP 8      .200       1.985     0.073  46    0.147  79    0.066 348    0.041 243    0.022 131    0.010  34    0.002 299    0.006  68    0.007 352
DCP 9      .250       1.632     0.263 140    0.040 200    0.066 113    0.049 225    0.010 110    0.020 136    0.012 258    0.009  91    0.006 110
DCP10      .300       1.349     0.169 109    0.154 200    0.097 272    0.043 311    0.003 296    0.020 319    0.020  10    0.023  54    0.013  36
DCP11      .399       0.972     0.117  33    0.050 106    0.031 217    0.025 237    0.011 173    0.001 255    0.007 132    0.011 277    0.007  67
DCP12      .501       0.635     0.201  29    0.077 102    0.035 186    0.022 187    0.014 170    0.004  83    0.010  32    0.013 304    0.010  12
DCP13      .600       0.430     0.156  27    0.021 122    0.012 126    0.026 155    0.017 154    0.001 108    0.009 311    0.010 296    0.012 312
DCP14      .701       0.321     0.066  44    0.036 256    0.010  10    0.013  81    0.002 143    0.009  95    0.006 289    0.005 246    0.002 298
DCP15      .800       0.141     0.053  33    0.031 247    0.008  35    0.003  79    0.007  89    0.003  42    0.002  33    0.006 323    0.004 269
DCP16      .900      -0.094     0.053  25    0.004 228    0.009 350    0.004 164    0.005 127    0.002 117    0.002 196    0.001 338    0.005 306
DCP17      .969      -0.092     0.013  49    0.002 225    0.008 306    0.003  95    0.004 174    0.000 223    0.003 172    0.001 326    0.002 328
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                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         22.64        0.051        0.695        2.47         0.0          9.96        12143.2       20

              V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TMP          EXT DAMP
               224.5        128774.      0.10E 08    -0.048        1.041        11.09       -0.00096      1.675        0.0
              (736.6)      (2689.5)                                     HARMONIC ANALYSIS
DATA
TYPE     X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                9.956    2.470   0    0.086  31    0.027 230    0.029  97    0.018  64    0.013 186    0.017 321    0.011 251    0.019 202
CN                   0.965    0.089  45    0.016  79    0.011 123    0.001  52    0.003 279    0.001 299    0.001  90    0.005 277    0.007 221
CM                  -0.018    0.027 192    0.003  49    0.001  70    0.000 113    0.001  32    0.000 254    0.001 322    0.001 180    0.002  25

DCP 1    .010        2.641    0.356   0    0.041  85    0.007 122    0.005 318    0.006 200    0.003  51    0.003  17    0.006 302    0.003 124
DCP 2    .020        2.538    0.423   1    0.048  65    0.010 125    0.004 133    0.005 240    0.000 337    0.003  38    0.002  18    0.003 250
DCP 3    .030        2.406    0.372   0    0.073  73    0.010  59    0.004 161    0.005 302    0.004 287    0.002 344    0.003 187    0.005 175
DCP 4    .049        2.394    0.305   3    0.068  65    0.014 359    0.007 247    0.005 237    0.003 278    0.000  18    0.002 115    0.003 187
DCP 5    .074        2.319    0.152  15    0.119  69    0.028  11    0.014  18    0.013 300    0.007 297    0.008 265    0.009 185    0.006 127
DCP 6    .099        2.252    0.097 122    0.160  69    0.021  73    0.041  48    0.019 339    0.011 353    0.018 315    0.013 249    0.006 180
DCP 7    .149        2.065    0.234 146    0.087  60    0.077 134    0.034  57    0.016  86    0.014  40    0.016 347    0.011 259    0.001 170
DCP 8    .200        1.835    0.319 154    0.005 299    0.077 134    0.017 237    0.003 132    0.013 227    0.013 297    0.025 216    0.035  18
DCP 9    .250        1.471    0.100 129    0.028 247    0.028 282    0.015 288    0.026 306    0.014 296    0.008  66    0.007 238    0.015 263
DCP10    .300        1.269    0.077  96    0.025  76    0.012 147    0.007 268    0.010 321    0.007 240    0.004  57    0.009 262    0.016 268
DCP11    .399        1.054    0.106  93    0.013 199    0.028  98    0.018 164    0.008  17    0.006 293    0.005  25    0.007 176    0.010 222
DCP12    .501        0.785    0.122  55    0.027 168    0.016 113    0.007 140    0.006 319    0.004 104    0.012 125    0.008  47    0.013 237
DCP13    .600        0.556    0.149  73    0.014 138    0.013 116    0.007 181    0.010 195    0.001 346    0.009 133    0.008  14    0.012 241
DCP14    .701        0.419    0.168   7    0.003 146    0.005 289    0.006 300    0.011 178    0.003  62    0.003 118    0.006   3    0.012 200
DCP15    .800        0.231    0.162   1    0.009 286    0.012 300    0.006 329    0.010 236    0.001 157    0.005 242    0.007 301    0.010 196
DCP16    .900       -0.029    0.131 359    0.006  50    0.008 215    0.009  12    0.002 215    0.003 348    0.001 207    0.006 318    0.006 126
DCP17    .969       -0.081    0.025 352    0.003  23    0.005 270    0.005  21    0.002 265    0.003 346    0.003  14    0.006  46    0.004 151


                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         22.68        0.052        0.683        2.46         0.0         12.50        12143.3       20

              V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TMP          EXT DAMP
               223.6        128185.      0.10E 08    -0.091        1.118        14.63       -0.00122      2.178        0.0
              (733.6)      (2677.2)                                     HARMONIC ANALYSIS
DATA
TYPE     X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               12.500    2.463   0    0.076  29    0.035 231    0.010  86    0.019 350    0.009  68    0.005 135    0.027 264    0.023 271
CN                   1.029    0.090  44    0.017 216    0.009 236    0.002 313    0.009 172    0.004 344    0.005 239    0.000 121    0.008 253
CM                  -0.052    0.033 193    0.002  54    0.001  98    0.002  25    0.003 319    0.001  63    0.001  25    0.001 155    0.002  47

DCP 1    .010        2.986    0.263   0    0.019  52    0.008 281    0.014 337    0.006  47    0.005 196    0.032 156    0.035  30    0.035 234
DCP 2    .020-       2.833    0.258   6    0.031  71    0.013 150    0.007   4    0.007 151    0.003  84    0.006 190    0.003  98    0.002 213
DCP 3    .030        2.571    0.055 120    0.111  85    0.047 135    0.036  54    0.010 120    0.021  64    0.003 300    0.011  71    0.007 258
DCP 4    .049        2.568    0.387  28    0.068  82    0.027 136    0.021  67    0.008  78    0.034 288    0.009 191    0.008  98    0.002 339
DCP 5    .074        2.491    0.094 148    0.048 110    0.051 154    0.017  95    0.007 176    0.004  71    0.011 241    0.012 103    0.006 354
DCP 6    .099        2.259    0.189 163    0.070 210    0.059 192    0.008 186    0.032 219    0.004 342    0.010 269    0.007 101    0.009 345
DCP 7    .149        1.999    0.154 149    0.125 229    0.059 276    0.070 331    0.026 242    0.023 333    0.007  26    0.009 139    0.010   8
DCP 8    .200        1.743    0.115 128    0.112 232    0.065 296    0.014   8    0.018 188    0.021  16    0.017 153    0.015 189    0.001 265
DCP 9    .250        1.478    0.107 105    0.018 241    0.010 188    0.011  18    0.006 127    0.013  25    0.007 249    0.037 169    0.017 255
DCP10    .300        1.285    0.096  99    0.019 226    0.002 351    0.012  28    0.005 245    0.004 257    0.006 148    0.004 202    0.015 278
DCP11    .399        1.050    0.107  55    0.013  47    0.004  95    0.016 317    0.008 149    0.013 326    0.005 213    0.006 284    0.012 276
DCP12    .501        0.854    0.139  40    0.015 308    0.007 247    0.009 326    0.013 186    0.003 290    0.008 224    0.007 327    0.011 237
DCP13    .600        0.717    0.151  27    0.015 215    0.011 275    0.012 242    0.018 172    0.005 310    0.012 248    0.005  31    0.016 231
DCP14    .701        0.617    0.157  16    0.015 199    0.011 268    0.009 185    0.013 164    0.002 189    0.005 292    0.004 228    0.011 265
DCP15    .800        0.639    0.163   4    0.006 133    0.038 231    0.012 203    0.012 149    0.006  79    0.003 221    0.006  36    0.009 197
DCP16    .900        0.109    0.113   0    0.017 212    0.003 283    0.013 157    0.012 115    0.003 266    0.002 218    0.001 346    0.006 242
DCP17    .965       -0.063    0.033   6    0.011 229    0.006 180    0.037 197    0.012  76    0.008 208    0.010 128    0.001 343    0.008 153
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                  0.0        45.17      0.101      0.696      2.83       0.0        2.43      12145.2      20

                 V          Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                  227.3      127898.    0.10E 08  -0.023      0.813      5.15      -0.00100    1.824       0.0
                 (745.8)    (2671.2)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              2.428   2.833   0  0.098  14  0.095 245  0.025 113  0.031  48  0.002 332  0.011 237  0.011 150  0.008 331
CN                 0.474   0.326 346  0.006 253  0.005 148  0.004  26  0.003 267  0.003  16  0.002 231  0.002  48  0.001 217
CM                -0.007   0.016 296  0.003  84  0.032 311  0.001 130  0.000  57  0.000 227  0.000  81  0.000 160  0.000   1

DCP 1     .010     0.495   1.283 336  0.112  27  0.011 146  0.008 182  0.003   4  0.007 335  0.009   0  0.006  74  0.004  29
DCP 2     .020     0.624   1.065 341  0.104  38  0.011 139  0.005 305  0.003 100  0.004  43  0.004  70  0.004 130  0.002 340
DCP 3     .030     0.751   0.878 340  0.099  38  0.008 142  0.005 319  0.003 100  0.002  25  0.003  56  0.003 111  0.001 306
DCP 4     .049     1.076   0.801 340  0.104  37  0.007 165  0.007 331  0.006  78  0.003  45  0.004  38  0.004 111  0.000 351
DCP 5     .074     1.219   0.727 339  0.076  35  0.007 163  0.008 200  0.005 234  0.003  51  0.002  99  0.003 105  0.001 142
DCP 6     .099     1.357   0.732 339  0.107  39  0.025 127  0.004 263  0.012  63  0.011 111  0.003 165  0.004  88  0.004 150
DCP 7     .149     1.250   0.854 338  0.125  48  0.058 266  0.074 357  0.026 109  0.036 290  0.036  23  0.017 150  0.021 306
DCP 8     .200     0.962   0.800 341  0.020  90  0.126 289  0.016  48  0.076 240  0.025 339  0.050 191  0.032 274  0.025 137
DCP 9     .250     0.546   0.871 337  0.153 206  0.100 280  0.126 150  0.022 243  0.066  90  0.012 286  0.047  34  0.021 257
DCP10     .300     0.3[illegible]   0.657 343  0.253 223  0.118 109  0.036  94  0.049   0  0.008 288  0.021 267  0.015 132  0.003  21
DCP11     .399     0.455   0.276 359  0.061 227  0.083  97  0.063 327  0.003  48  0.021 279  0.015 161  0.004  45  0.004 115
DCP12     .501     0.297   0.136  21  0.036  19  0.008  99  0.016 311  0.011 197  0.007  61  0.003 301  0.002 271  0.001 200
DCP13     .600     0.269   0.101  29  0.036  20  0.010 241  0.002 242  0.002 170  0.003 340  0.001 277  0.002 192  0.002 200
DCP14     .701     0.322   0.067  37  0.024  13  0.008 225  0.001 246  0.000 265  0.002 112  0.001 332  0.002 280  0.001 307
DCP15     .800     0.124   0.039  36  0.005   0  0.005 203  0.002 319  0.001 167  0.000 207  0.003 292  0.002   0  0.000 129
DCP16     .900    -0.125   0.009  25  0.005 249  0.006 196  0.004 318  0.001 241  0.001  54  0.001 334  0.001   4  0.001 237
DCP17     .969    -0.074   0.015 192  0.004 268  0.004 210  0.002 356  0.000 188  0.002  96  0.002 320  0.001   0  0.003 165

                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                  0.0        45.49      0.101      0.703      2.66       0.0        7.42      12147.1      20

                 V          Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                  229.7      129688.    0.10E 08  -0.062      1.116      8.39      -0.00200    3.707       0.0
                 (753.7)    (2708.6)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              7.417   2.658   0  0.035  18  0.326 188  0.112  68  0.020  17  0.008 233  0.010 161  0.006 121  0.018 357
CN                 0.864   0.144  45  0.063  61  0.003  37  0.017  62  0.035  12  0.006 318  0.001 345  0.004 203  0.003 117
CM                -0.010   0.034 231  0.006 194  0.003 115  0.004 220  0.003 148  0.003 109  0.001 104  0.002  28  0.000  93

DCP 1     .010     2.277   0.649 359  0.103  43  0.317  82  0.029  47  0.003  32  0.034  42  0.005 287  0.006  54  0.001 246
DCP 2     .020     2.047   0.652   4  0.077  25  0.321  43  0.028  46  0.010  28  0.035  21  0.001  35  0.001 105  0.001  38
DCP 3     .030     1.974   0.613   4  0.082  10  0.025  22  0.023  42  0.013  10  0.034  15  0.003 357  0.003  71  0.002  80
DCP 4     .049     2.080   0.468   5  0.367 352  0.008  75  0.015  26  0.038   2  0.006 276  0.005 298  0.001 134  0.005 324
DCP 5     .074     2.121   0.408   6  0.349   5  0.002  46  0.005  48  0.036  45  0.005 296  0.006 279  0.002 150  0.001 356
DCP 6     .099     2.148   0.321   9  0.068  31  0.019 321  0.013 230  0.016 119  0.008 346  0.008 275  0.005 197  0.002  15
DCP 7     .149     2.074   0.192  24  0.137  50  0.357 320  0.024 213  0.014 109  0.006 317  0.006 207  0.004 105  0.002  26
DCP 8     .200     1.560   0.178 122  0.200  69  0.363   4  0.016  82  0.021 347  0.034 332  0.008 295  0.010 256  0.008 155
DCP 9     .250     1.557   0.384 123  0.344 134  0.379  84  0.080 119  0.017 132  0.039  64  0.035  85  0.024   5  0.028  35
DCP10     .300     1.296   0.329  95  0.177 126  0.101 173  0.062 158  0.030 165  0.022 185  0.030 114  0.023 116  0.031 148
DCP11     .399     0.960   0.239  46  0.190  76  0.037 143  0.030 109  0.007 288  0.014 344  0.009 338  0.008 272  0.011 133
DCP12     .501     0.646   0.303  35  0.140  62  0.031  92  0.044  77  0.026 115  0.004  22  0.004 343  0.022 244  0.007 183
DCP13     .600     0.464   0.294  41  0.367  32  0.024   7  0.049  60  0.031  38  0.019  23  0.006 116  0.016 122  0.010  81
DCP14     .701     0.375   0.172  91  0.036 323  0.034 309  0.024   4  0.030 325  0.025 321  0.016 321  0.009 263  0.014 334
DCP15     .800     0.185   0.139  41  0.036 302  0.019 278  0.013 356  0.021 309  0.023 269  0.015 248  0.015 197  0.007 274
DCP16     .900    -0.062   0.112  24  0.030 317  0.027 288  0.011 307  0.014 291  0.020 241  0.008 231  0.007 172  0.008 228
DCP17     .969    -0.077   0.034  37  0.011 357  0.015 306  0.014  34  0.017 313  0.036 247  0.007 358  0.006 258  0.002  32
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                           FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0        45.26      0.101      0.701      2.62        0.0         9.93     12147.2      20

                V          Q          RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                 228.8      129253.    0.10E 08  -0.055      1.084       11.04     -0.00121    2.232       0.0
                (750.6)    (2699.5)                          HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              9.932   2.619   0  0.101  24  0.046 228  0.070 145  0.007 334  0.004  73  0.008 249  0.015 160  0.011 335
CN                 0.929   0.139  51  0.022  66  0.005  67  0.002 152  0.003 239  0.002 144  0.003 317  0.002  34  0.000 201
CM                -0.019   0.031 210  0.001 181  0.002 128  0.002 298  0.002  39  0.001 325  0.001 133  0.001 228  0.000  74

DCP 1     .010     2.710   0.394   2  0.061  58  0.007 241  0.017 183  0.003 165  0.005   1  0.006  92  0.003   9  0.003 194
DCP 2     .020     2.475   0.450   6  0.081  77  0.001  22  0.012 230  0.007 215  0.004  49  0.004  86  0.003 308  0.003 191
DCP 3     .030     2.388   0.461   4  0.061  72  0.011 163  0.010 208  0.004 202  0.006  25  0.001 303  0.001 168  0.002  57
DCP 4     .049     2.379   0.359   6  0.075  67  0.015 337  0.014 229  0.008 205  0.004 119  0.004  40  0.004 323  0.004 155
DCP 5     .074     2.311   0.201  19  0.136  70  0.043 348  0.013 289  0.016 260  0.007 167  0.006  93  0.007 313  0.009 176
DCP 6     .099     2.254   0.114  91  0.175  67  0.034   5  0.027  21  0.019 282  0.000 156  0.005 234  0.002 257  0.008 148
DCP 7     .149     2.063   0.228 121  0.090  55  0.061 109  0.025  30  0.012  72  0.011  31  0.003 345  0.002 311  0.005 158
DCP 8     .200     1.549   0.340 135  0.023 117  0.075 126  0.007 246  0.026 100  0.009 123  0.014  85  0.005  57  0.006  41
DCP 9     .250     1.453   0.145 107  0.049 234  0.020 232  0.030 282  0.017 351  0.008 218  0.011 263  0.007  53  0.008 104
DCP10     .300     1.272   0.149  70  0.017 309  0.030  96  0.014 277  0.007 338  0.011 212  0.006   8  0.006 351  0.012 309
DCP11     .399     1.060   0.195  72  0.016 227  0.006  36  0.019 190  0.009 317  0.007 332  0.016 262  0.006  63  0.008  75
DCP12     .501     0.788   0.213  54  0.019 141  0.002 282  0.016 146  0.003 264  0.009 335  0.004  49  0.005 205  0.013 348
DCP13     .600     0.556   0.217  36  0.015  73  0.006 284  0.009 128  0.017 212  0.012 134  0.002  98  0.003  89  0.011 203
DCP14     .701     0.416   0.184  21  0.017  21  0.017 334  0.012  95  0.012 212  0.009 172  0.005   3  0.008 354  0.004 236
DCP15     .800     0.228   0.149  13  0.021  42  0.013 290  0.006  64  0.004 255  0.009 130  0.009 319  0.009  99  0.005 119
DCP16     .900    -0.033   0.093  13  0.018  36  0.010 302  0.005 103  0.007 189  0.007 101  0.008 301  0.004 327  0.004 234
DCP17     .969    -0.086   0.027  25  0.015  73  0.008  17  0.003  31  0.007 218  0.006 241  0.008 303  0.004 278  0.006 297

                           FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0        45.34      0.102      0.697      2.61        0.0        12.45     12147.3      20

                V          Q          RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                 227.0      127759     0.10E 08  -0.090      1.164       13.82     -0.00120    2.197       0.0
                (744.9)    (2668.                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             12.446   2.606   0  0.085  12  0.039 222  0.018 267  0.041  10  0.013 163  0.010 134  0.009 174  0.010   5
CN                 1.040   0.121  49  0.012 178  0.001 271  0.009 269  0.010  22  0.005 219  0.001 215  0.003 241  0.004 215
CM                -0.056   0.035 236  0.004 337  0.002 191  0.003  27  0.003 161  0.001   7  0.001  25  0.001   4  0.001  27

DCP 1     .010     3.032   0.296 359  0.028  81  0.004  42  0.007 287  0.006 311  0.001 162  0.004 156  0.000  12  0.003  57
DCP 2     .020     2.630   0.313   8  0.039  66  0.008 181  0.008 333  0.003 340  0.006  56  0.003 234  0.006 325  0.002 213
DCP 3     .030     2.577   0.127  42  0.112  71  0.023 104  0.025  10  0.005  82  0.020  27  0.009 293  0.009 328  0.010 236
DCP 4     .049     2.614   0.180  20  0.066  69  0.012  89  0.009 317  0.004  27  0.005 169  0.007  88  0.006 327  0.005  21
DCP 5     .074     2.435   0.104  97  0.037  73  0.049 141  0.009 178  0.016  79  0.003 279  0.009  29  0.006 242  0.012  33
DCP 6     .049     2.255   0.213 143  0.027 238  0.057 164  0.025 225  0.007 147  0.011 250  0.007  42  0.007 242  0.006 338
DCP 7     .149     1.984   0.182 136  0.101 227  0.047 251  0.034 287  0.015 313  0.019 272  0.009 314  0.015  52  0.007 264
DCP 8     .200     1.558   0.136 123  0.083 223  0.052 260  0.030 354  0.003  10  0.003 300  0.015 324  0.004 231  0.009 191
DCP 9     .250     1.537   0.169  88  0.014 230  0.010 150  0.033 342  0.030  61  0.010 175  0.007 185  0.012 275  0.007 218
DCP10     .300     1.331   0.157  71  0.006 180  0.018 330  0.020 333  0.014  79  0.006 218  0.013 120  0.016   7  0.005 100
DCP11     .399     1.075   0.168  39  0.031  32  0.015 102  0.022 336  0.029  69  0.007 141  0.004  52  0.008 321  0.009 150
DCP12     .501     0.879   0.183  40  0.009 236  0.011 354  0.017 237  0.020  37  0.011 278  0.005 297  0.021 221  0.020 231
DCP13     .600     0.740   0.174  33  0.014 171  0.016  22  0.014 216  0.018  39  0.019 250  0.002 115  0.021 206  0.011 262
DCP14     .701     0.636   0.169  26  0.025 153  0.007   7  0.015 193  0.018 312  0.008 180  0.005 207  0.006  96  0.001 125
DCP15     .800     0.445   0.156  21  0.017 144  0.008  86  0.017 204  0.016 304  0.014 162  0.010 196  0.005  11  0.008 220
DCP16     .900     0.111   0.110  20  0.023 162  0.008 327  0.016 192  0.016 318  0.004 123  0.004 258  0.010 120  0.006 131
DCP17     .969    -0.026   0.036  51  0.014 165  0.005 281  0.013 229  0.003 307  0.004  42  0.002  32  0.004 241  0.002  88
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   0.0         66.88       0.153        0.702        3.17         0.0          -0.02        12149.1       20

                 V           Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                 229.8        129655.      0.10E 08    -0.039        0.441         3.13        -0.00084      1.568        0.0
                (754.1)      (2707.9)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              -0.019    3.169   0    0.120 306    0.091 198    0.030  91    0.015  22    0.011  55    0.007 185    0.014 240    0.006  97
CN                  0.140    0.299 347    0.004 308    0.005 190    0.001  66    0.001 177    0.001 170    0.001 337    0.001 227    0.003  67
CM                 -0.018    0.022 294    0.000 221    0.001  93    0.000 111    0.001 315    0.000 280    0.001  20    0.000  67    0.001 240

DCP 1     .010     -0.901    1.718 329    0.083 356    0.099 263    0.061 317    0.024 339    0.023 264    0.024 301    0.006 338    0.007 257
DCP 2     .020     -0.724    1.515 335    0.155  24    0.009 353    0.029 352    0.050  36    0.028  94    0.006  45    0.018  61    0.015 107
DCP 3     .030     -0.428    1.371 335    0.212  31    0.075  93    0.024 128    0.043  49    0.056 108    0.036 166    0.005 151    0.030 114
DCP 4     .049      0.072    1.145 335    0.145  35    0.118  96    0.134 153    0.097 214    0.073 271    0.032 327    0.005 261    0.027 297
DCP 5     .074      0.385    0.840 336    0.037 193    0.065 263    0.018 332    0.009 351    0.003  62    0.001  82    0.007  64    0.005  78
DCP 6     .099      0.531    0.866 337    0.049 198    0.049 269    0.013 168    0.016  14    0.007 121    0.008 355    0.006 143    0.004 353
DCP 7     .149      0.449    0.793 337    0.153 211    0.057  88    0.022 242    0.046  47    0.041 273    0.021 108    0.017 253    0.025 101
DCP 8     .200      0.232    0.468 348    0.069 235    0.073 120    0.078 352    0.073 229    0.061 104    0.035 349    0.012 234    0.003 290
DCP 9     .250      0.209    0.376 347    0.038   2    0.036 235    0.014 119    0.006  20    0.001  37    0.002 222    0.004  85    0.004 213
DCP10     .300      0.213    0.327 348    0.023 350    0.021 227    0.007  98    0.004  30    0.001 245    0.002 200    0.002  61    0.003 202
DCP11     .399      0.191    0.265   1    0.012   6    0.013 252    0.004 140    0.004 100    0.001  82    0.003 209    0.002  95    0.004   4
DCP12     .501      0.147    0.199   6    0.007  15    0.008 261    0.002 205    0.003 110    0.003 266    0.001 161    0.002 242    0.005   6
DCP13     .600      0.163    0.145  15    0.005 357    0.007 253    0.001 178    0.002 131    0.001 142    0.001 174    0.003 225    0.006  45
DCP14     .701      0.253    0.094  24    0.007  14    0.006 263    0.001 195    0.004 136    0.001  91    0.003 227    0.002 226    0.004  57
DCP15     .800      0.088    0.052  48    0.002  45    0.002 274    0.002 284    0.003 150    0.001 286    0.001 216    0.001 131    0.004 100
DCP16     .900     -0.126    0.026 110    0.005 157    0.003 319    0.000 232    0.002 276    0.001 214    0.004 189    0.002  80    0.003 115
DCP17     .969     -0.057    0.030 174    0.003 159    0.002 103    0.001 137    0.004 103    0.001 179    0.002 350    0.007 277    0.000  63

                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   0.0         68.97       0.153        0.700        3.12         0.0           2.42        12149.2       20

                 V           Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                 228.8        129176       0.10E 08    -0.030        0.806         5.44        -0.00089      1.670        0.0
                (750.8)      (2697.9)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.421    3.122   0    0.134 332    0.129 170    0.037  79    0.012 322    0.013 125    0.008  11    0.009 167    0.011 256
CN                  0.477    0.306 344    0.005 245    0.008 139    0.006  22    0.005 218    0.002 347    0.003 170    0.002 314    0.003 157
CM                 -0.007    0.022 285    0.002  64    0.001 302    0.001 122    0.000  68    0.000 151    0.000 320    0.000 116    0.000 199

DCP 1     .010      0.677    1.227 328    0.116 356    0.042  98    0.002 122    0.006  78    0.004  59    0.003 215    0.003 112    0.003 117
DCP 2     .020      0.624    1.008 335    0.105  14    0.029 120    0.003 216    0.007  88    0.002 154    0.002 301    0.003  92    0.002 116
DCP 3     .030      0.745    0.848 334    0.101  15    0.021 120    0.003 199    0.006  65    0.002 121    0.002 307    0.002  30    0.002  89
DCP 4     .049      1.071    0.775 334    0.104  17    0.023 130    0.004 280    0.007  59    0.005 166    0.005 314    0.004  16    0.002 113
DCP 5     .074      1.213    0.703 334    0.077  13    0.021 135    0.010 156    0.007 169    0.003 173    0.002 271    0.004  11    0.004 106
DCP 6     .099      1.349    0.707 334    0.105  22    0.036 121    0.004 248    0.012  45    0.009 116    0.004 241    0.007  19    0.007 114
DCP 7     .149      1.247    0.819 332    0.130  32    0.053 218    0.067 327    0.036  73    0.036 225    0.038 325    0.023  85    0.026 212
DCP 8     .200      0.955    0.776 336    0.025  84    0.126 264    0.022  33    0.081 200    0.034 290    0.050 131    0.040 211    0.025  59
DCP 9     .250      0.974    0.866 331    0.180 185    0.102 297    0.146 110    0.032 220    0.096  34    0.025 224    0.053 319    0.033 179
DCP10     .300      0.731    0.614 340    0.246 207    0.126  84    0.048  42    0.053 292    0.008 149    0.019 195    0.011  52    0.007 170
DCP11     .399      0.453    0.262   8    0.051 223    0.078  77    0.046 294    0.008 169    0.012 230    0.014 108    0.004 321    0.002 350
DCP12     .501      0.303    0.156  35    0.044   2    0.006 186    0.009 261    0.005 162    0.003  18    0.001 236    0.003 239    0.001  47
DCP13     .600      0.277    0.124  42    0.037   6    0.014 225    0.002 192    0.000 308    0.001 186    0.001 204    0.002 265    0.002 348
DCP14     .701      0.325    0.086  51    0.021   0    0.010 208    0.001  86    0.000 225    0.001 161    0.001  81    0.002 292    0.001 237
DCP15     .800      0.125    0.050  53    0.003   0    0.005 216    0.004 317    0.002 260    0.001  62    0.002  16    0.001 296    0.002 146
DCP16     .900     -0.123    0.009  48    0.003 166    0.005 145    0.004   0    0.002 142    0.003 264    0.002 270    0.000  59    0.002 151
DCP17     .969     -0.076    0.018 190    0.005 195    0.005 161    0.004 293    0.001 329    0.003 348    0.002 189    0.003 354    0.002 347
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0          69.11        0.154        0.699        2.97         0.0          4.96         12149.3      20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                228.2        128716       0.10E 08    -0.044        1.075         8.07        -0.00094      1.742        0.0
               (748.6)      (2688.3)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              4.957    2.969   0    0.333   7    0.095 176    0.052 115    0.017  24    0.010 226    0.002 313    0.015 147    0.008 285
CN                 0.712    0.333   6    0.028 317    0.010 182    0.001 139    0.006 289    0.000 304    0.003  15    0.004 279    0.003 177
CM                -0.005    0.029 236    0.018  48    0.002 285    0.002 237    0.003 100    0.002 353    0.002 243    0.002  97    0.000 356

DCP 1    .010      1.673    1.058 337    0.127  30    0.012  36    0.013 111    0.002 112    0.004 297    0.001  25    0.007 250    0.005 143
DCP 2    .020      1.472    0.917 344    0.062  32    0.028 118    0.014 147    0.010  98    0.004 324    0.004  10    0.005 302    0.002 167
DCP 3    .030      1.473    0.782 343    0.032  22    0.036 117    0.012 148    0.013  83    0.004 319    0.005   7    0.006 268    0.002 185
DCP 4    .049      1.679    0.624 344    0.056  33    0.036 108    0.007  89    0.004  74    0.004 305    0.002 195    0.003 199    0.003 162
DCP 5    .074      1.756    0.582 344    0.072  34    0.031 102    0.006  86    0.003  95    0.001 225    0.002 167    0.003 220    0.003 192
DCP 6    .099      1.880    0.524 345    0.069  37    0.018  99    0.006  46    0.002 250    0.001 239    0.002 170    0.001 208    0.001 202
DCP 7    .149      1.850    0.490 344    0.076  30    0.023  96    0.008 139    0.009 222    0.003 282    0.003 343    0.001 104    0.000  96
DCP 8    .200      1.430    0.570 354    0.207  36    0.157 130    0.078 195    0.062 268    0.022 330    0.018   3    0.005 101    0.012  18
DCP 9    .250      1.263    0.743  10    0.284  14    0.035 188    0.019  20    0.120  51    0.032  80    0.014 174    0.035 107    0.040 101
DCP10    .300      1.045    0.665  10    0.213  11    0.159 292    0.100 299    0.013 188    0.017 334    0.048 323    0.032 290    0.037 228
DCP11    .399      0.737    0.465  13    0.081 255    0.070 271    0.004 148    0.044 247    0.010 243    0.020 199    0.005 208    0.009 205
DCP12    .501      0.530    0.344  16    0.122 244    0.052 205    0.034 155    0.028 147    0.021  58    0.007  97    0.009  13    0.005 335
DCP13    .600      0.396    0.231  28    0.112 236    0.051 156    0.041 106    0.027  36    0.022 327    0.008 218    0.011 284    0.011 180
DCP14    .701      0.341    0.149  59    0.075 222    0.047  96    0.028  29    0.033 304    0.026 211    0.018 102    0.009 310    0.003  85
DCP15    .800      0.137    0.099  52    0.047 214    0.027  50    0.008 322    0.017 275    0.018 161    0.018  29    0.014 251    0.005  86
DCP16    .900     -0.106    0.054   5    0.041 202    0.020  37    0.010 354    0.020 247    0.014 130    0.011  22    0.010 248    0.003 126
DCP17    .969     -0.088    0.013  12    0.025 241    0.005  25    0.007  91    0.009 298    0.004 206    0.005 117    0.005  44    0.009 300

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                 0.0          68.71        0.153        0.699        2.83         0.0          7.43         12151.1      20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                228.7        128827.      0.10E 08    -0.084        1.202         9.59        -0.00160      2.977        0.0
               (750.3)      (2690.6)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              7.431    2.833   0    0.259  40    0.058 195    0.034 130    0.014  12    0.004 156    0.013 191    0.027 151    0.007 309
CN                 0.871    0.298  42    0.018  21    0.012 313    0.0[illegible] 155    0.008 335    0.003 193    0.003 140    0.003  68    0.002  50
CM                -0.017    0.053 223    0.017  93    0.004 101    0.001 302    0.003 116    0.003  14    0.002 312    0.002 234    0.001 235

DCP 1    .010      2.269    0.782 353    0.145  84    0.021 261    0.013  97    0.005 110    0.006 341    0.004 109    0.006  26    0.008 246
DCP 2    .020      2.043    0.777   0    0.087 105    0.040 329    0.012 160    0.007  31    0.009  42    0.004 253    0.007 102    0.004 310
DCP 3    .030      1.981    0.719 358    0.054 116    0.040 336    0.006 149    0.012 325    0.007  69    0.005 301    0.005  50    0.003 235
DCP 4    .049      2.095    0.563 359    0.039 117    0.020 322    0.008 203    0.006 311    0.000 234    0.003 304    0.002 203    0.002 275
DCP 5    .074      2.133    0.497   0    0.034 117    0.017 296    0.013 174    0.004 331    0.002 240    0.001 268    0.001 178    0.002 276
DCP 6    .099      2.193    0.407   6    0.043  65    0.034 256    0.022 156    0.006  10    0.005 249    0.002 245    0.003 183    0.002 260
DCP 7    .149      2.053    0.289  28    0.116  24    0.056 240    0.015 142    0.009 158    0.004  95    0.002  19    0.003 256    0.003 245
DCP 8    .200      1.529    0.331  98    0.203  33    0.036 328    0.038 282    0.019 216    0.007 184    0.013 191    0.015  84    0.010 322
DCP 9    .250      1.526    0.513 101    0.051  61    0.112  41    0.038  96    0.042 332    0.039 328    0.011 205    0.031 266    0.008 197
DCP10    .300      1.294    0.470  84    0.188 117    0.063 159    0.006 334    0.040  69    0.037  64    0.023  66    0.019 342    0.004  48
DCP11    .399      0.889    0.436  46    0.113  86    0.009  78    0.037 239    0.004  95    0.005 259    0.021 318    0.027 181    0.017  52
DCP12    .501      0.655    0.442  38    0.058  26    0.037  24    0.028 101    0.021  82    0.009 140    0.009 230    0.009 147    0.005 254
DCP13    .600      0.506    0.368  39    0.078 311    0.060 346    0.019  43    0.043   0    0.017 348    0.013 314    0.009  49    0.004  79
DCP14    .701      0.421    0.256  41    0.121 271    0.042 280    0.009 200    0.040 300    0.028 232    0.018 197    0.007 115    0.013 134
DCP15    .800      0.221    0.208  30    0.101 258    0.024 248    0.016 169    0.022 248    0.027 172    0.023 106    0.019  17    0.003 233
DCP16    .900     -0.038    0.168  15    0.079 266    0.031 221    0.034  57    0.016 232    0.021 176    0.020 111    0.013  31    0.006  43
DCP17    .969     -0.064    0.056  17    0.029 273    0.018 241    0.006  58    0.012 272    0.009 204    0.017 148    0.021  68    0.016 141
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                0.0       68.80       0.153        0.699       2.88        0.0          9.94       12151.2      20

              V          Q           RN           CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
              228.3      128659.     0.10E 08     -0.062      1.190       11.49       -0.00113     2.107       0.0
             (749.1)    (2687.1)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.939    2.885   0   0.154  15   0.015 170   0.051 103   0.019  23   0.003 186   0.007 157   0.024 141   0.007 315
CN                 0.944    0.211  52   0.016  43   0.025  32   0.002  28   0.002 205   0.002 254   0.004  37   0.001 180   0.001 174
CM                -0.023    0.042 216   0.005  34   0.005 177   0.002 255   0.002   6   0.001 157   0.001 219   0.000 349   0.001 327

DCP 1     .010     2.704    0.491 356   0.068  80   0.007 120   0.005 246   0.007 338   0.001 105   0.004  24   0.002  47   0.001 104
DCP 2     .020     2.449    0.531   6   0.097  80   0.009 302   0.003 220   0.001 275   0.004 159   0.004  99   0.005  32   0.007 314
DCP 3     .030     2.322    0.475   6   0.124  73   0.023 300   0.011 192   0.004 111   0.005  67   0.005 342   0.001 294   0.002 262
DCP 4     .049     2.376    0.433   5   0.064  61   0.024 311   0.010 127   0.005 118   0.002 171   0.002 332   0.002 117   0.002 338
DCP 5     .074     2.308    0.284  23   0.130  44   0.046 298   0.003  80   0.007 200   0.001 151   0.002 156   0.004  76   0.002  50
DCP 6     .099     2.248    0.210  73   0.176  38   0.026 323   0.040 349   0.024 236   0.007 188   0.010 145   0.004  42   0.001 136
DCP 7     .149     2.063    0.293 102   0.122  27   0.066  69   0.044 318   0.021  30   0.021 260   0.007 353   0.011 207   0.003 348
DCP 8     .200     1.622    0.353 112   0.046   5   0.098  94   0.017 246   0.039  43   0.007 228   0.013 356   0.010 346   0.014 270
DCP 9     .250     1.508    0.300 101   0.092 244   0.030  15   0.014 231   0.008 303   0.003  99   0.004 118   0.014 192   0.007 230
DCP10     .300     1.263    0.235  63   0.035 358   0.049  64   0.009 246   0.008 277   0.015 223   0.004 161   0.008 177   0.013 167
DCP11     .399     1.067    0.302  66   0.006 176   0.042  45   0.020 173   0.008 339   0.015 109   0.010  20   0.014  53   0.002  95
DCP12     .501     0.813    0.307  54   0.034 152   0.052  32   0.013  96   0.003  72   0.003 227   0.012  64   0.019 313   0.011  13
DCP13     .600     0.583    0.279  41   0.013 174   0.046  17   0.017  59   0.018 257   0.002 332   0.009  10   0.012 170   0.007 134
DCP14     .701     0.435    0.224  27   0.014 154   0.023 328   0.005 108   0.017 167   0.003  12   0.006  84   0.004 112   0.008 206
DCP15     .800     0.246    0.186  18   0.009 237   0.016 312   0.013  47   0.019 172   0.006 322   0.010 307   0.006 202   0.004 165
DCP16     .900    -0.029    0.121  23   0.007 317   0.009 308   0.008  25   0.007 158   0.013 344   0.005 161   0.001  23   0.007  53
DCP17     .969    -0.080    0.043  44   0.008 294   0.008 302   0.002 310   0.002 328   0.007 241   0.004  88   0.004  85   0.009 226

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                0.0       23.18       0.166        0.208       4.86        0.0          0.04       12001.1      20

              V          Q           RN           CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
               70.9       12889.     0.33E 07     -0.047      0.519        4.75       -0.00137     0.793       0.0
             (232.6)     (269.2)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.043    4.858   0   0.216   4   0.026 241   0.001  10   0.010 340   0.045 127   0.020 221   0.006 335   0.002  23
CN                 0.134    0.396 358   0.014  27   0.003  83   0.002 111   0.002 317   0.004 193   0.004 353   0.008 285   0.004  86
CM                -0.024    0.019 296   0.003 315   0.001 315   0.000  26   0.000 136   0.001  88   0.001 235   0.002  99   0.001 265

DCP 1     .010    -0.659    2.072 346   0.178  23   0.031  82   0.011 206   0.012 279   0.018 147   0.007 252   0.018 302   0.013 346
DCP 2     .020    -0.439    2.082 349   0.081 347   0.011  65   0.008 244   0.009 232   0.023 160   0.009 256   0.014 276   0.003  66
DCP 3     .030     0.008    1.749 349   0.059 334   0.001 123   0.002 210   0.003 249   0.017 144   0.003   9   0.008 265   0.004  55
DCP 4     .049    -0.036    1.411 350   0.049 342   0.005  14   0.004 107   0.007 260   0.010 185   0.010 334   0.004 313   0.010 119
DCP 5     .074     0.177    1.143 350   0.041 347   0.010 349   0.005  64   0.003 279   0.014 178   0.005 357   0.007 277   0.012  89
DCP 6     .099     0.394    0.976 352   0.032 358   0.010 356   0.012  68   0.001 136   0.007 208   0.010 359   0.010 273   0.007 141
DCP 7     .149     0.201    0.730 353   0.032  18   0.012   7   0.012  36   0.012 314   0.009 133   0.014 311   0.007 273   0.013  75
DCP 8     .200     0.228    0.592 357   0.025   3   0.010  86   0.007 173   0.005  79   0.007 193   0.011 358   0.008 315   0.002  31
DCP 9     .250     0.148    0.517 357   0.024  23   0.006   9   0.010 100   0.004 332   0.007 236   0.009 322   0.007 333   0.003 356
DCP10     .300     0.230    0.437 358   0.020  23   0.006 146   0.006 107   0.004 228   0.007 155   0.003  53   0.004   9   0.007  76
DCP11     .399     0.244    0.353   5   0.016  45   0.007 222   0.003 149   0.007 322   0.007 162   0.008 318   0.017 266   0.006  60
DCP12     .501     0.133    0.264  11   0.008  46   0.008 108   0.005 180   0.004   6   0.002 114   0.005  31   0.011 272   0.003 184
DCP13     .600     0.156    0.201  16   0.007  84   0.011 127   0.002  40   0.004 120   0.006 183   0.006 295   0.013 302   0.005 177
DCP14     .701     0.205    0.150  20   0.014 108   0.003  64   0.006 103   0.012 352   0.005 237   0.006 162   0.010 300   0.005  73
DCP15     .800     0.113    0.096  29   0.012 119   0.002 213   0.003 307   0.005 318   0.004 280   0.003  88   0.012 293   0.011  90
DCP16     .900    -0.072    0.022  81   0.009 121   0.007   8   0.008 263   0.007 194   0.004 230   0.010  45   0.013 185   0.003 219
DCP17     .969     0.027    0.022 166   0.009 276   0.003 218   0.006 117   0.006 194   0.013 297   0.008  24   0.009  25   0.011   8
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                                 FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                    0.0         23.21        0.172          0.202        4.87         0.0          2.47        12001.2      20

                  V            Q            RN             CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                   68.6          12209.      0.32E 07      -0.040        0.779         7.40       -0.00146      0.820        0.0
                 (225.0)        (255.0)                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.469     4.868   0    0.226   4    0.043 266    0.002 246    0.015  37    0.012  88    0.031 195    0.011 134    0.004  26
CN                  0.361     0.407 358    0.017  10    0.004 351    0.002  14    0.001 118    0.002 287    0.004 157    0.014 131    0.001  50
CM                 -0.017     0.020 293    0.001 290    0.001 143    0.000 109    0.000 117    0.001 110    0.001 349    0.005 319    0.002 216

DCP 1     .010      0.964     2.750 346    0.127  10    0.015  10    0.010 318    0.002  91    0.006 345    0.011 139    0.012  43    0.017 184
DCP 2     .020      0.724     2.153 349    0.088   3    0.027 340    0.006 316    0.007 136    0.004  29    0.001 236    0.018  70    0.011 162
DCP 3     .030      0.989     1.819 349    0.066 355    0.027 336    0.008 355    0.006 172    0.005 206    0.005 163    0.016  56    0.011 225
DCP 4     .049      0.801     1.471 349    0.049 340    0.005  19    0.002  10    0.003 352    0.009 174    0.006 332    0.017  83    0.008 198
DCP 5     .074      0.860     1.178 350    0.042 353    0.009  26    0.003  17    0.000 140    0.004 200    0.004  17    0.011 104    0.006 213
DCP 6     .099      0.964     1.001 351    0.038   3    0.006  55    0.006  44    0.005  72    0.002 235    0.003 216    0.016 106    0.003 291
DCP 7     .149      0.641     0.766 352    0.034  11    0.006  67    0.007 353    0.015  84    0.003  87    0.003  36    0.003 355    0.003  45
DCP 8     .200      0.578     0.623 357    0.020  23    0.003 113    0.005 168    0.008 237    0.008 154    0.005  59    0.005  45    0.012 180
DCP 9     .250      0.427     0.529 357    0.024  19    0.007 357    0.009 331    0.007  55    0.007  30    0.005 197    0.022 105    0.002 331
DCP10     .300      0.494     0.445 358    0.023  15    0.006   7    0.002 286    0.006 160    0.008  43    0.006  87    0.009 143    0.003 289
DCP11     .399      0.450     0.355   7    0.020  31    0.007 319    0.009 112    0.009 251    0.008 331    0.008 161    0.023 144    0.002 148
DCP12     .501      0.272     0.280  11    0.016  28    0.003 316    0.004 113    0.004  20    0.007 196    0.009 158    0.015 170    0.003  63
DCP13     .600      0.259     0.211  16    0.013  34    0.012 326    0.009  17    0.001 215    0.013 240    0.003 146    0.013 167    0.005 323
DCP14     .701      0.270     0.152  21    0.015  35    0.007 107    0.005  24    0.003 131    0.006 338    0.016 169    0.021 129    0.003  94
DCP15     .800      0.141     0.095  29    0.008  87    0.002 297    0.004 238    0.005 290    0.003  45    0.003 159    0.021 124    0.003 346
DCP16     .900     -0.059     0.033  65    0.011 157    0.005 263    0.009 298    0.007  11    0.011 295    0.005 265    0.024 128    0.016  50
DCP17     .969      0.008     0.030 161    0.008 257    0.009  21    0.010 183    0.011 152    0.010 287    0.006 130    0.015 141    0.008  29
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                                 FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                    0.0         23.21        0.174          0.199        4.87         0.0          4.97        12001.3      20

                  V            Q            RN             CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                   67.8          11913.      0.32E 07      -0.035        1.013         9.78       -0.00149      0.830        0.0
                 (222.4)        (248.2)                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.975     4.873   0    0.226   5    0.040 265    0.004 270    0.016  40    0.006  22    0.027 185    0.004  96    0.005  18
CN                  0.600     0.412 358    0.019  14    0.004  87    0.002  39    0.003 349    0.001 290    0.003  32    0.008  11    0.004 216
CM                 -0.011     0.020 294    0.002 257    0.001 296    0.001 195    0.001 227    0.000  65    0.001 246    0.002 219    0.001  47

DCP 1     .010      2.621     2.807 346    0.124 321    0.044 137    0.025  72    0.011 284    0.009  58    0.015 302    0.017 307    0.014 180
DCP 2     .020      1.975     2.176 349    0.090 355    0.008  56    0.002  50    0.008 280    0.002  72    0.016 318    0.024 339    0.015 235
DCP 3     .030      2.022     1.856 349    0.083 357    0.007 353    0.007  79    0.001  24    0.002 342    0.009 314    0.019 342    0.004 188
DCP 4     .049      1.697     1.518 349    0.066 355    0.002 321    0.006  72    0.002 233    0.002 307    0.001 139    0.010 349    0.002 121
DCP 5     .074      1.584     1.203 350    0.054 357    0.009  35    0.008 137    0.012 343    0.005 215    0.006 224    0.014 329    0.001 322
DCP 6     .099      1.548     1.012 352    0.042   3    0.007 345    0.007 114    0.007 347    0.004 211    0.006 216    0.013 323    0.006  81
DCP 7     .149      1.093     0.769 353    0.028 351    0.013 358    0.002 139    0.009 354    0.004  25    0.009 235    0.019 315    0.003 117
DCP 8     .200      0.921     0.638 358    0.026   2    0.009 126    0.007 236    0.002 170    0.003 115    0.011 301    0.013  22    0.010 205
DCP 9     .250      0.734     0.534 358    0.021  13    0.008  73    0.006 225    0.011 273    0.004 134    0.007 336    0.011  35    0.010 225
DCP10     .300      0.748     0.448 359    0.017  37    0.004  10    0.001 147    0.005 211    0.002 229    0.008  65    0.008 349    0.007 172
DCP11     .399      0.653     0.365   7    0.021  50    0.006 141    0.006  67    0.004 239    0.009   1    0.009  11    0.011  51    0.006 245
DCP12     .501      0.431     0.276  10    0.021  37    0.007  84    0.004 302    0.004 359    0.004 302    0.008  67    0.006  40    0.002 172
DCP13     .600      0.362     0.208  17    0.019  29    0.006 133    0.001 339    0.010  22    0.006 270    0.005  71    0.017  20    0.001  73
DCP14     .701      0.354     0.141  26    0.019  24    0.011  39    0.005  39    0.011   5    0.002 335    0.007  44    0.003  31    0.009 327
DCP15     .800      0.189     0.089  39    0.009  50    0.002 304    0.004 313    0.005   8    0.002 205    0.004  78    0.011  20    0.008 235
DCP16     .900     -0.037     0.040  35    0.004 238    0.012 135    0.017  45    0.008 170    0.008 135    0.002 297    0.003  22    0.007 183
DCP17     .969     -0.013     0.010 135    0.005 213    0.008 149    0.004 326    0.007  95    0.007 266    0.012  93    0.006  45    0.019 208
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                            FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         23.13       0.175       0.199       4.87        0.0         7.47       12001.4      20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               67.5        11826.      0.32E 07   -0.041       1.225       12.29      -0.00171     0.943       0.0
              (221.4)     (247.0)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.474     4.873   0   0.220   6   0.041 260   0.002 237   0.018  50   0.005 344   0.026 193   0.003  76   0.003   6
CN                 0.833     0.401   0   0.017  31   0.006 117   0.004 312   0.001 268   0.003 245   0.002 291   0.011 343   0.005 107
CM                -0.008     0.022 290   0.003 332   0.004 316   0.002 107   0.000 225   0.001  32   0.001 141   0.005 178   0.002 282

DCP 1     .010     4.008     2.412 344   0.282  46   0.189 331   0.080 228   0.054 283   0.063 207   0.033 147   0.021 195   0.033  78
DCP 2     .020     3.213     2.115 352   0.093 358   0.008 357   0.012 228   0.015 303   3.006 247   0.008 213   0.020 221   0.007  68
DCP 3     .030     3.055     1.816 350   0.074 351   0.008  71   0.011 230   0.011 313   0.007 209   0.008 244   0.012 218   0.010 192
DCP 4     .049     2.579     1.499 350   0.070   2   0.011   5   0.014  65   0.002 201   0.007  13   0.008 210   0.013 230   0.007 230
DCP 5     .074     2.281     1.182 351   0.051   0   0.010  29   0.007  71   0.004 252   0.005 334   0.005 172   0.012 268   0.003 173
DCP 6     .099     2.107     0.998 352   0.046 358   0.009  33   0.006 100   0.001 256   0.005   6   0.006 208   0.015 276   0.002  46
DCP 7     .149     1.526     0.767 354   0.038  10   0.002 251   0.019  33   0.009  10   0.005 188   0.005 194   0.010 238   0.002 114
DCP 8     .200     1.276     0.621 359   0.030  14   0.004 284   0.005   9   0.004 264   0.008 331   0.004  22   0.011 262   0.003 316
DCP 9     .250     1.045     0.535 359   0.021  38   0.013  92   0.012  10   0.009 106   0.002 191   0.003  49   0.013 350   0.004  94
DCP10     .300     1.000     0.435   1   0.022  14   0.008 186   0.009 316   0.007 206   0.006 278   0.006 221   0.010 355   0.005 225
DCP11     .399     0.854     0.356   9   0.014  53   0.015 137   0.001  21   0.007 208   0.008 246   0.002 336   0.010 352   0.011 132
DCP12     .501     0.584     0.269  13   0.012  46   0.013 115   0.006 333   0.008 246   0.007 255   0.008 340   0.013 347   0.003 126
DCP13     .600     0.465     0.213  19   0.015  80   0.014 132   0.004 145   0.005 229   0.011 268   0.008 314   0.021 359   0.009  25
DCP14     .701     0.430     0.141  34   0.014  92   0.009 105   0.012 274   0.004  36   0.006 118   0.003  91   0.017  39   0.009 127
DCP15     .800     0.236     0.094  45   0.006  85   0.018 111   0.008 312   0.006 174   0.004 352   0.009 180   0.016 338   0.004  32
DCP16     .900    -0.015     0.051  52   0.012 179   0.011 183   0.015 265   0.011  33   0.010 191   0.020 326   0.027 341   0.021 126
DCP17     .969    -0.009     0.010  85   0.007 222   0.013 144   0.005  52   0.011   1   0.005  73   0.002 183   0.015 357   0.012  73
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                            FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         23.24       0.175       0.199       4.87        0.0         9.95       12001.5      20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               67.5        11879.      0.32E 07   -0.026       1.419       14.87      -0.00170     0.941       0.0
              (221.6)     (248.1)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.945     4.867   0   0.231   7   0.037 270   0.004 273   0.022  58   0.007 352   0.028 199   0.017 172   0.006  14
CN                 1.027     0.378   4   0.031  19   0.004   9   0.004 357   0.002 227   0.006  17   0.005 213   0.016 194   0.002  75
CM                 0.000     0.023 293   0.003 228   0.001 171   0.001 122   0.001  41   0.001 212   0.001  40   0.005  30   0.001 239

DCP 1     .010     5.216     2.133 348   0.210  32   0.122 151   0.160  44   0.032 127   0.106  27   0.016  79   0.039  43   0.024 347
DCP 2     .020     4.312     2.040 352   0.094 359   0.021 334   0.009   2   0.007 180   0.010   2   0.013 156   0.023 163   0.008  47
DCP 3     .030     3.984     1.772 351   0.081 346   0.023 320   0.013  11   0.002  59   0.006 330   0.010 157   0.018 151   0.005 231
DCP 4     .049     3.355     1.431 353   0.093 359   0.004 212   0.010  52   0.007  32   0.003  42   0.007 254   0.016 166   0.002 289
DCP 5     .074     2.892     1.133 354   0.073 358   0.006 243   0.002 330   0.002   7   0.005   5   0.003 287   0.020 152   0.003  99
DCP 6     .099     2.596     0.950 355   0.055   5   0.001  62   0.005  44   0.003 218   0.002  69   0.004 222   0.021 136   0.001 216
DCP 7     .149     1.912     0.723 357   0.041   7   0.005 105   0.010 246   0.012  56   0.007 323   0.004 218   0.015 152   0.005 356
DCP 8     .200     1.587     0.602   2   0.030   1   0.001  90   0.006  64   0.003 264   0.004   5   0.009 193   0.024 189   0.010 323
DCP 9     .250     1.312     0.511   2   0.029  21   0.015  15   0.003 206   0.006 246   0.007 261   0.007 188   0.013 212   0.009 113
DCP10     .300     1.210     0.412   4   0.031  22   0.004  37   0.004 279   0.007 292   0.006 305   0.006 295   0.015 190   0.008 130
DCP11     .399     1.007     0.329  13   0.038  33   0.003 354   0.006 317   0.004 246   0.006  31   0.007 256   0.018 181   0.012 181
DCP12     .501     0.713     0.250  19   0.029  32   0.008   4   0.005 352   0.004 238   0.009   8   0.005 219   0.018 216   0.007  68
DCP13     .600     0.537     0.167  27   0.026  29   0.011   8   0.001 265   0.002 116   0.009  39   0.010 145   0.017 228   0.006  62
DCP14     .701     0.474     0.133  42   0.027  32   0.007 338   0.010 328   0.009 221   0.004 122   0.006 196   0.021 209   0.004 269
DCP15     .800     0.254     0.093  55   0.019  36   0.003  40   0.005 353   0.002 224   0.006  37   0.006 146   0.021 204   0.003   1
DCP16     .900    -0.002     0.057  32   0.003  60   0.003 329   0.008 100   0.003  34   0.001 116   0.015 260   0.014 180   0.011  67
DCP17     .969    -0.013     0.012  63   0.007 317   0.004 263   0.011 279   0.007 187   0.019   9   0.006 255   0.019 212   0.005 334
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.M       ALPHA.0     TEST POINT  CYCLES ANALYSED
                    0.0        23.11       0.167       0.206       4.84        0.0         12.47      12003.1      20

                  V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   70.5        12736.      0.33E 07   -0.107       1.611       17.30      -0.00011     0.064       0.0
                  (231.3)     (266.0)
                                                          .  HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               12.473    4.838   0    0.253   5    0.044 237    0.008  53    0.015 357    0.024 124    0.031 218    0.008 198    0.003  54
CN                   1.122    0.465  30    0.086 268    0.041  87    0.017 311    0.011 172    0.005  17    0.003 307    0.002 278    0.007 103
CM                  -0.027    0.024 182    0.036   0    0.020 217    0.006  89    0.003 332    0.002 180    0.000 303    0.002  35    0.002 286

DCP 1     .010       5.132    1.647  37    0.777 357    0.401 228    0.147 188    0.195 148    0.065 349    0.120 236    0.036 191    0.024  64
DCP 2     .020       4.313    1.767  32    0.634 345    0.218 223    0.051 148    0.077  99    0.081 351    0.059 259    0.022 121    0.044  69
DCP 3     .030       4.199    1.685  28    0.586 326    0.283 188    0.152  56    0.065 290    0.030 225    0.016 137    0.023   8    0.010  23
DCP 4     .049       3.065    1.142  51    0.643   3    0.246 260    0.080 173    0.047 129    0.040  62    0.042 326    0.026 293    0.022 136
DCP 5     .074       2.673    1.022  49    0.525 347    0.208 229    0.058 110    0.017  89    0.022  30    0.026 307    0.010 357    0.002 352
DCP 6     .099       2.565    0.948  45    0.428 333    0.172 199    0.058  74    0.013  57    0.026 339    0.021 253    0.014  20    0.004 141
DCP 7     .149       1.979    0.839  33    0.301 296    0.155 149    0.057  11    0.011  28    0.024 270    0.008 113    0.029  36    0.009  46
DCP 8     .200       1.777    0.794  24    0.269 269    0.161 122    0.074 358    0.021 285    0.021 214    0.010 126    0.018   7    0.005 321
DCP 9     .250       1.535    0.702  19    0.211 246    0.141  93    0.059 339    0.028 283    0.043 181    0.029  69    0.019 349    0.017 240
DCP10     .300       1.349    0.590  19    0.175 235    0.129  72    0.060 305    0.031 226    0.012 118    0.012  14    0.004 290    0.006 196
DCP11     .399       1.132    0.479  24    0.149 221    0.109  62    0.052 294    0.026 187    0.017  80    0.013 322    0.013 231    0.022 100
DCP12     .501       0.857    0.388  24    0.138 213    0.100  55    0.033 288    0.025 187    0.015  78    0.011 295    0.007 202    0.014 105
DCP13     .600       0.726    0.306  29    0.118 204    0.081  47    0.023 272    0.016 194    0.015  60    0.008 332    0.010 204    0.006  86
DCP14     .701       0.550    0.219  38    0.105 192    0.065  37    0.022 241    0.015 139    0.022 356    0.005  81    0.006 191    0.017  85
DCP15     .800       0.333    0.146  24    0.097 176    0.052  11    0.014 221    0.016 117    0.016 336    0.005 127    0.007 221    0.007 100
DCP16     .900       0.078    0.116   2    0.060 164    0.023  38    0.008 280    0.021 107    0.004 299    0.007 139    0.006 209    0.009 148
DCP17     .969       0.034    0.065 347    0.033 160    0.018  19    0.009 282    0.006 284    0.018 281    0.018 228    0.008 331    0.006 301

                              FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.M       ALPHA.0     TEST POINT  CYCLES ANALYSED
                    0.0        22.97       0.172       0.200       4.82        0.0         14.95      12003.2      20

                  V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   68.0        11989.      0.32E 07   -0.320       2.216       19.75       0.00094    -0.526       0.0
                  (223.1)     (250.4)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               14.954    4.817   0    0.258  13    0.045 288    0.036 253    0.040 109    0.041 347    0.013 181    0.010 133    0.005 234
CN                   1.277    0.574  44    0.196 307    0.119 207    0.087 110    0.056  18    0.036 284    0.019 192    0.028  57    0.006 340
CM                  -0.052    0.087 176    0.063  52    0.039 333    0.031 241    0.019 147    0.015  49    0.007 326    0.011 235    0.006 138

DCP 1     .010       4.952    2.052 112    1.094  28    0.283  30    0.415 337    0.220 331    0.205 281    0.159 206    0.134 142    0.087 100
DCP 2     .020       4.235    1.854  93    1.015  25    0.157 353    0.150 320    0.073 318    0.120 276    0.111 213    0.102 141    0.078 100
DCP 3     .030       4.167    1.739  84    1.027  17    0.305 310    0.246 253    0.147 159    0.065  92    0.056  49    0.064 348    0.036 268
DCP 4     .049       3.449    1.203  83    0.787  32    0.317 308    0.111 211    0.047  49    0.068 284    0.058 178    0.037  82    0.033  66
DCP 5     .074       3.033    1.146  76    0.686  12    0.278 280    0.118 194    0.036 100    0.011 274    0.026 132    0.038  54    0.026  23
DCP 6     .099       2.853    1.097  70    0.603 357    0.241 263    0.126 194    0.072 115    0.023  48    0.027  94    0.033  39    0.019 351
DCP 7     .149       2.196    0.992  58    0.487 337    0.221 255    0.168 189    0.094 109    0.048  28    0.029  75    0.051  14    0.045 306
DCP 8     .200       1.958    0.916  49    0.415 330    0.245 257    0.195 183    0.097 112    0.050  55    0.030  42    0.074  12    0.037 291
DCP 9     .250       1.713    0.842  39    0.350 311    0.251 236    0.226 151    0.144  74    0.108  10    0.050 303    0.067 307    0.067 209
DCP10     .300       1.574    0.769  35    0.321 299    0.238 223    0.220 136    0.140  52    0.099 345    0.071 279    0.048 251    0.044 155
DCP11     .399       1.345    0.710  33    0.307 285    0.224 210    0.208 121    0.145  42    0.111 330    0.079 256    0.036 173    0.062 120
DCP12     .501       1.029    0.616  28    0.270 269    0.201 192    0.194 100    0.124  13    0.090 295    0.056 224    0.055 135    0.038  78
DCP13     .600       0.864    0.530  24    0.267 252    0.179 170    0.170  78    0.126 348    0.098 264    0.068 182    0.069  89    0.036  20
DCP14     .701       0.687    0.418  19    0.257 238    0.184 151    0.162  53    0.106 319    0.100 221    0.058 133    0.072  67    0.056 332
DCP15     .800       0.442    0.325   7    0.215 230    0.158 137    0.129  31    0.096 298    0.088 196    0.051  99    0.079  30    0.047 279
DCP16     .900       0.149    0.223   3    0.092 227    0.088 136    0.066  14    0.053 281    0.044 194    0.031 130    0.051  25    0.038 299
DCP17     .969       0.066    0.110 350    0.047 254    0.034 125    0.025  39    0.014 286    0.029 199    0.025  33    0.027  21    0.011 310
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       22.96      0.174       0.197       4.81        0.0         17.44      12003.3      20

               V          Q          RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                67.1       11702.     0.32E 07   -0.409       2.446       21.61       0.00045    -0.250       0.0
              (220.1)     (244.4)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             17.441    4.808   0   0.212  11   0.013 278   0.046   0   0.046 264   0.057 120   0.033 183   0.007  33   0.015 307
CN                 1.328    0.647  55   0.106 345   0.111 303   0.129 235   0.099 143   0.048  56   0.016 328   0.015 211   0.008 265
CM                -0.078    0.125 180   0.065  99   0.044  47   0.061 351   0.036 270   0.021 135   0.008 124   0.006  73   0.005  47

DCP 1     .010     4.473    2.591 121   0.510  99   0.692  71   0.176 107   0.231  96   0.256  88   0.171  36   0.140   9   0.115 351
DCP 2     .020     3.987    2.365 110   0.606  83   0.559  55   0.150 332   0.031 214   0.114 105   0.062  65   0.043  34   0.039  25
DCP 3     .030     3.936    2.120 106   0.706  68   0.615  46   0.359 335   0.171 299   0.102 271   0.098 246   0.131 212   0.093 173
DCP 4     .049     3.421    1.565 109   0.806  60   0.317  21   0.233 325   0.145 235   0.098  99   0.050 334   0.031 218   0.029 280
DCP 5     .074     3.008    1.391  99   0.622  48   0.328  16   0.286 311   0.152 224   0.037 103   0.035 281   0.041 217   0.035 209
DCP 6     .099     2.810    1.273  90   0.491  41   0.355  10   0.307 297   0.140 222   0.016 165   0.036 254   0.071 208   0.042 169
DCP 7     .149     2.208    1.142  73   0.362  28   0.359 350   0.278 282   0.148 217   0.032 161   0.062 243   0.079 193   0.047 142
DCP 8     .200     1.980    1.012  66   0.368  25   0.332 346   0.284 290   0.169 229   0.045 195   0.064 230   0.087 194   0.044 144
DCP 9     .250     1.747    0.931  56   0.328   5   0.303 321   0.294 263   0.217 201   0.105 155   0.061 142   0.100 129   0.056  56
DCP10     .300     1.624    0.844  48   0.307 353   0.258 308   0.274 252   0.225 177   0.093 127   0.070 111   0.091  79   0.065  13
DCP11     .399     1.439    0.799  43   0.309 339   0.246 291   0.265 244   0.235 166   0.133 110   0.090  77   0.057  45   0.084 351
DCP12     .501     1.137    0.730  34   0.279 316   0.213 266   0.233 216   0.217 137   0.131  76   0.080  24   0.047 341   0.076 297
DCP13     .600     0.948    0.686  27   0.293 297   0.218 239   0.214 189   0.216 113   0.139  41   0.089 342   0.060 290   0.072 258
DCP14     .701     0.774    0.585  20   0.266 281   0.182 223   0.204 171   0.201  87   0.145   9   0.091 304   0.079 245   0.058 195
DCP15     .800     0.527    0.429  10   0.201 276   0.129 214   0.152 162   0.154  71   0.110 345   0.076 280   0.072 227   0.064 162
DCP16     .900     0.245    0.293   0   0.153 270   0.070 203   0.099 145   0.102  47   0.076 318   0.029 215   0.014 171   0.022 167
DCP17     .969     0.127    0.184 359   0.121 276   0.070 191   0.075 101   0.068  23   0.057 292   0.057 188   0.035 105   0.039  10

                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       23.23      0.175       0.199       4.80        0.0         19.94      12003.4      20

               V          Q          RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                67.5       11865.     0.32E 07   -0.383       2.220       22.92      -0.00230     1.275       0.0
              (221.4)     (247.8)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             19.944    4.796   0   0.205  12   0.025 224   0.029  80   0.061  11   0.044 245   0.022 212   0.012  89   0.003 356
CN                 1.280    0.605  60   0.091  39   0.106  21   0.115 318   0.088 242   0.033 167   0.028  77   0.010 329   0.004 322
CM                -0.106    0.126 194   0.044 138   0.032 128   0.035  76   0.027  11   0.017 299   0.012 259   0.004 225   0.003 236

DCP 1     .010     3.335    1.803 113   0.739 148   0.282 145   0.128 167   0.218 231   0.212 189   0.139 157   0.093 152   0.087 137
DCP 2     .020     3.100    1.755 107   0.619 134   0.248 112   0.116  38   0.123 286   0.117 226   0.054 187   0.074 188   0.073 189
DCP 3     .030     3.147    1.589 108   0.606 124   0.387  91   0.259  46   0.096  11   0.040 347   0.078  33   0.054   0   0.031 327
DCP 4     .049     3.096    1.509 123   0.516 105   0.378 106   0.255  38   0.039 335   0.016 341   0.046  45   0.041 326   0.030 299
DCP 5     .074     2.725    1.263 110   0.353 103   0.336  88   0.234  20   0.072 331   0.035 314   0.052  33   0.042 332   0.029 335
DCP 6     .099     2.515    1.092  98   0.306 103   0.301  73   0.233  13   0.098 325   0.040 321   0.069  16   0.046 337   0.036 350
DCP 7     .149     2.012    0.931  78   0.310  94   0.249  57   0.250  17   0.106 307   0.016 304   0.060  16   0.038 349   0.056 328
DCP 8     .200     1.841    0.833  73   0.252  80   0.250  55   0.242  14   0.126 310   0.038 308   0.052   7   0.048 343   0.048 318
DCP 9     .250     1.674    0.769  66   0.197  56   0.234  34   0.239 350   0.173 290   0.068 272   0.040 317   0.052 277   0.061 271
DCP10     .300     1.596    0.742  59   0.180  34   0.220  25   0.238 336   0.195 273   0.105 246   0.049 241   0.054 255   0.036 216
DCP11     .399     1.445    0.737  52   0.161  18   0.179  17   0.219 325   0.195 266   0.094 234   0.049 197   0.049 227   0.049 187
DCP12     .501     1.176    0.697  42   0.144 354   0.153 354   0.184 302   0.175 241   0.092 187   0.067 147   0.031 193   0.038 150
DCP13     .600     0.997    0.701  34   0.188 338   0.146 329   0.191 277   0.175 213   0.113 155   0.084 109   0.030 101   0.029  98
DCP14     .701     0.855    0.619  26   0.191 323   0.142 309   0.184 253   0.163 188   0.117 125   0.091  80   0.040  45   0.052  33
DCP15     .800     0.617    0.476  22   0.126 317   0.120 308   0.140 248   0.123 175   0.113 107   0.097  63   0.064  16   0.053 337
DCP16     .900     0.308    0.304  21   0.076 298   0.064 291   0.066 234   0.062 141   0.062  65   0.037  26   0.020  47   0.014  78
DCP17     .969     0.136    0.186  23   0.077 295   0.057 249   0.068 188   0.061 112   0.057  38   0.048 332   0.018 242   0.021 176
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0       45.86      0.333       0.205       5.21        0.0         0.38      12005.1      20

            V          Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             70.2       12669.     0.33E 07   -0.076       0.491        5.30      -0.00146     0.074       0.0
            (230.3)    (264.6)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                0.075   5.208   0    0.284   3    0.066 326    0.028 109    0.036 104    0.025  65    0.015 217    0.030 267    0.011 161
CN                   0.143   0.358  16    0.025  48    0.008  72    0.021  61    0.012 288    0.002 322    0.026 276    0.009 254    0.003 142
CM                  -0.026   0.040 289    0.004 282    0.003 285    0.012 233    0.003 126    0.002 138    0.002 263    0.004  36    0.001 303

DCP 1     .010      -0.507   2.609 346    0.167  14    0.021  47    0.075 193    0.006 223    0.015 186    0.023 227    0.013  51    0.006 166
DCP 2     .020      -0.437   1.890 352    0.075 353    0.016 345    0.073 211    0.009 239    0.015 209    0.015 247    0.026   8    0.008 221
DCP 3     .030       0.015   1.597 352    0.070 344    0.023 342    0.038 223    0.010 221    0.009 298    0.030 294    0.013 343    0.008 171
DCP 4     .049      -0.061   1.284 353    0.064   0    0.028 325    0.038 202    0.010 266    0.014  36    0.013 159    0.006 327    0.006 256
DCP 5     .074       0.159   1.030 355    0.054   2    0.013  20    0.033 213    0.007 272    0.006 203    0.003 154    0.012   7    0.004 177
DCP 6     .099       0.395   0.883 358    0.046  22    0.011  67    0.031 193    0.014 285    0.002 329    0.037 135    0.012 330    0.004  25
DCP 7     .149       0.213   0.661   4    0.051  30    0.014  29    0.030 193    0.009 290    0.016 126    0.003 [illegible]    0.015 316    0.007 152
DCP 8     .200       0.223   0.534  12    0.036  45    0.012   8    0.027 221    0.001 179    0.008 232    0.007 355    0.010  77    0.003 228
DCP 9     .250       0.175   0.489  13    0.027  33    0.021  63    0.022  31    0.020 270    0.005 115    0.006  26    0.012 354    0.005 151
DCP10     .300       0.220   0.402  16    0.033  64    0.006  66    0.031  41    0.009 284    0.013 105    0.009 237    0.012 292    0.013  87
DCP11     .399       0.259   0.341  33    0.031  92    0.007  90    0.042  52    0.015 260    0.005 343    0.008 330    0.027 295    0.008 127
DCP12     .501       0.144   0.293  43    0.032  56    0.003 129    0.027  48    0.013 272    0.006 272    0.005 330    0.028 255    0.004 214
DCP13     .600       0.187   0.249  51    0.028  46    0.017  61    0.031  69    0.011 254    0.008 291    0.008 264    0.019 246    0.004  43
DCP14     .701       0.221   0.187  59    0.012 128    0.017 138    0.042  52    0.022 319    0.005 301    0.012 264    0.031 186    0.009 240
DCP15     .800       0.118   0.136  71    0.016  98    0.014 119    0.038  59    0.022 296    0.011  11    0.003 164    0.017 153    0.006 205
DCP16     .900      -0.074   0.081  95    0.017  67    0.014  77    0.052  43    0.011 295    0.013 321    0.019 336    0.005 193    0.008 106
DCP17     .969       0.023   0.036 116    0.003 120    0.004  16    0.043  58    0.017  15    0.011 206    0.010 236    0.023 267    0.014  58
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ   DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0       46.00      0.344       0.200       5.20        0.0         2.40      12005.2      20

            V          Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             68.2       12051.     0.32E 07   -0.066       0.698        7.70      -0.00142     0.020       0.0
            (223.6)    (251.7)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                2.404   5.204   0    0.288   2    0.081 319    0.019 260    0.038 100    0.029  62    0.023 194    0.025 246    0.013 157
CN                   0.363   0.365  15    0.024  47    0.011  65    0.022   8    0.001 256    0.001 159    0.001 223    0.010 170    0.005 236
CM                  -0.020   0.039 290    0.005 300    0.003 291    0.011 198    0.001 236    0.001 159    0.001  30    0.003 310    0.003  71

DCP 1     .010       0.957   2.499 346    0.159   1    0.031  14    0.043 218    0.015 257    0.010 227    0.009 357    0.034 218    0.013  40
DCP 2     .020       0.684   1.962 352    0.109   3    0.044 352    0.053 227    0.003 153    0.009 228    0.008 178    0.034 253    0.015  61
DCP 3     .030       0.968   1.646 352    0.086   3    0.036 354    0.040 230    0.012 138    0.008 197    0.003 205    0.026 248    0.006  46
DCP 4     .049       0.733   1.323 354    0.074 349    0.031  14    0.032 216    0.003 231    0.004 305    0.010 209    0.016 199    0.011  89
DCP 5     .074       0.814   1.068 355    0.061   8    0.025 354    0.023 207    0.009 146    0.015 193    0.007  51    0.010 151    0.007   9
DCP 6     .099       0.957   0.897 358    0.057  19    0.028  12    0.031 219    0.008 211    0.015 176    0.001 206    0.022 125    0.010  71
DCP 7     .149       0.625   0.680   2    0.036  10    0.014  44    0.027 215    0.013  43    0.006 197    0.013  18    0.006 304    0.014  53
DCP 8     .200       0.557   0.557  12    0.032  38    0.018  97    0.025 221    0.009 270    0.008 284    0.007 207    0.022 278    0.008  69
DCP 9     .250       0.455   0.485  13    0.031  22    0.010  49    0.038 356    0.008 261    0.009  88    0.004 337    0.024 256    0.009 111
DCP10     .300       0.485   0.421  16    0.035  27    0.024  67    0.031 354    0.016 241    0.009 183    0.002  49    0.018 212    0.015 233
DCP11     .399       0.450   0.354  31    0.028  63    0.017  89    0.040  19    0.011 223    0.014 139    0.014  30    0.017 170    0.011 187
DCP12     .501       0.284   0.284  41    0.032  74    0.007  97    0.042  32    0.007 258    0.011  88    0.012 205    0.018 161    0.012 203
DCP13     .600       0.291   0.236  53    0.037  90    0.010  77    0.042  19    0.008 321    0.010  54    0.009  82    0.029 133    0.012 252
DCP14     .701       0.292   0.201  59    0.026 102    0.011  74    0.044  20    0.013  77    0.007 310    0.010 289    0.021 146    0.016 260
DCP15     .800       0.145   0.140  73    0.020  99    0.016  87    0.036  20    0.002   7    0.014 325    0.008 242    0.013  98    0.014 264
DCP16     .900      -0.067   0.066  90    0.010 225    0.010 153    0.039 349    0.012 101    0.013 231    0.011 207    0.014  15    0.004 246
DCP17     .969       0.010   0.016 151    0.007 126    0.003 109    0.026  34    0.015  29    0.008  21    0.012 156    0.017 221    0.009 286
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0      46.05      0.349      0.198     5.20       0.0         5.01      12005.3      20

               V         Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                67.2      11745.     0.32E 07  -0.062      0.960      10.26     -0.00147    0.843       0.0
               (220.5)   (245.3)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              5.006   5.199   0  0.293   3  0.090 308  0.019 190  0.036  96  0.027  63  0.019 215  0.021 244  0.009 140
CN                 0.587   0.366  16  0.022  41  0.008  55  0.018 119  0.005 281  0.005  20  0.004  29  0.009 146  0.003 198
CM                -0.012   0.042 292  0.003 297  0.001 311  0.007 337  0.001 106  0.002 182  0.002 212  0.004 292  0.001  15

DCP 1     .010     2.542   2.519 347  0.116 335  0.022 116  0.071  40  0.016 183  0.013   2  0.007 237  0.016 225  0.005  80
DCP 2     .020     1.886   1.942 352  0.108   5  0.019  38  0.072  47  0.013 183  0.024  63  0.019 271  0.014 224  0.004 176
DCP 3     .030     1.998   1.655 352  0.091   5  0.018 359  0.046  47  0.012 186  0.019  30  0.012 262  0.005 325  0.006 182
DCP 4     .049     1.593   1.360 354  0.069  12  0.028 350  0.035  27  0.008 186  0.004 305  0.009 269  0.015 265  0.014 280
DCP 5     .074     1.500   1.079 356  0.063   9  0.016   6  0.039  31  0.004 241  0.005  67  0.003  88  0.009 134  0.002 331
DCP 6     .099     1.518   0.910 359  0.056  16  0.027  33  0.030  32  0.011 178  0.015 356  0.005 137  0.015  95  0.002 338
DCP 7     .149     1.052   0.676   3  0.040  22  0.014  31  0.027  44  0.008 284  0.006 103  0.007  98  0.010 235  0.011 172
DCP 8     .200     0.914   0.577  11  0.035  66  0.020  12  0.041  38  0.009  52  0.009 117  0.007 294  0.009  69  0.014 242
DCP 9     .250     0.746   0.494  13  0.026  32  0.015  50  0.029 129  0.017 260  0.009 149  0.005 136  0.022 235  0.012 144
DCP10     .300     0.731   0.425  19  0.030  33  0.023  54  0.015 121  0.011 344  0.305  93  0.016 355  0.019 200  0.007  68
DCP11     .399     0.656   0.351  34  0.033  62  0.010  55  0.028 136  0.010 339  0.002 103  0.019  66  0.021 230  0.006  14
DCP12     .501     0.418   0.295  42  0.029  84  0.006  82  0.021 168  0.024 256  0.007 345  0.005 225  0.015 173  0.007 230
DCP13     .600     0.375   0.247  52  0.014  69  0.003  24  0.030 148  0.013 273  0.019 356  0.010  52  0.013 147  0.013 218
DCP14     .701     0.353   0.189  61  0.014  56  0.014 153  0.017 160  0.016 284  0.007 318  0.009 315  0.031 103  0.013 183
DCP15     .800     0.173   0.142  78  0.013 102  0.002 140  0.025 142  0.003 255  0.003 159  0.011  19  0.022  77  0.003  27
DCP16     .900    -0.051   0.084 101  0.003 118  0.013 137  0.039 134  0.003 117  0.008  13  0.003 167  0.024  76  0.013 147
DCP17     .969    -0.015   0.031 155  0.010 263  0.012  14  0.024 181  0.006 118  0.017  27  0.015  48  0.026 190  0.022 337

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0      45.99      0.352      0.196     5.20       0.0         7.51      12005.4      20

               V         Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                66.5      11558.     0.32E 07  -0.069      1.218      12.78     -0.00153    0.672       0.0
               (218.3)   (241.4)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              7.509   5.200   0  0.305   3  0.088 305  0.014 108  0.040  98  0.026  52  0.025 217  0.022 270  0.010 129
CN                 0.823   0.363  18  0.030  44  0.008  44  0.040 113  0.005 293  0.009 313  0.005 234  0.010 224  0.001 154
CM                -0.008   0.043 291  0.004 281  0.003 293  0.012 305  0.001 174  0.003 140  0.001  51  0.003 357  0.000 216

DCP 1     .010     3.974   2.255 346  0.258  39  0.202 330  0.042 223  0.038 252  0.070 191  0.035 129  0.018 122  0.016 108
DCP 2     .020     3.127   1.931 353  0.111 358  0.035 359  0.034  80  0.018 273  0.013 215  0.020 222  0.012  27  0.020 236
DCP 3     .030     3.026   1.674 353  0.094 354  0.024  12  0.029  93  0.002 271  0.008 152  0.018 254  0.014   6  0.011 213
DCP 4     .049     2.480   1.362 355  0.077   5  0.023  11  0.034  62  0.010 226  0.007 339  0.003 320  0.009 314  0.010 242
DCP 5     .074     2.219   1.092 356  0.069   7  0.018 342  0.037  86  0.013 281  0.011 306  0.010 281  0.013 254  0.010 231
DCP 6     .099     2.094   0.912   0  0.063  21  0.016 332  0.045  74  0.003 178  0.010 307  0.009 265  0.018 281  0.016 255
DCP 7     .149     1.492   0.700   2  0.051  23  0.012  22  0.031  57  0.005  10  0.006 225  0.014 199  0.017 280  0.005  32
DCP 8     .200     1.252   0.568  13  0.035  37  0.015  49  0.034  92  0.015 290  0.007 192  0.003 340  0.010  95  0.017 236
DCP 9     .250     1.043   0.486  15  0.041  32  0.008 156  0.039 102  0.909 249  0.017 304  0.012 232  0.027 319  0.007 107
DCP10     .300     0.991   0.418  18  0.035  46  0.020   6  0.040  95  0.011 220  0.009  49  0.005 283  0.021 270  0.012 354
DCP11     .399     0.861   0.354  37  0.039  63  0.003  88  0.056 132  0.011 321  0.009 335  0.004 268  0.026 278  0.013  85
DCP12     .501     0.580   0.284  44  0.034  74  0.011  62  0.063 121  0.011   0  0.019 327  0.007 265  0.026 220  0.011 143
DCP13     .600     0.481   0.245  55  0.022  82  0.008  26  0.052 114  0.012 255  0.029 324  0.007 197  0.039 211  0.009 138
DCP14     .701     0.437   0.202  67  0.021  57  0.021 105  0.039 135  0.006 333  0.007 322  0.005  76  0.028 172  0.008 226
DCP15     .800     0.217   0.149  82  0.017  99  0.016  69  0.037 124  0.009 322  0.016 258  0.004 189  0.024 126  0.005  81
DCP16     .900    -0.024   0.084  88  0.012  61  0.013 160  0.070 117  0.012 127  0.016 309  0.009 210  0.018 111  0.013  11
DCP17     .969    -0.021   0.008 115  0.009  18  0.011 128  0.036 125  0.005  50  0.014  50  0.018 270  0.024 317  0.018 285
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                                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                      TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                       0.0           46.03         0.353         0.196         5.20          0.0           10.01        12005.5         20

                      V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
                       66.4          11515.        0.32E 07     -0.060         1.400         15.18        -0.00159       0.905         0.0
                      (217.8)       (240.5)
                                                                          HARMONIC ANALYSIS
DATA
TYPE        X/C          RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                   10.007     5.200   0     0.281   7     0.101 300     0.035 102     0.032  91     0.023  75     0.032 241     0.012 216     0.008 216
CN                       1.029     0.354  20     0.033  47     0.006  35     0.046 134     0.004 294     0.001 353     0.006 322     0.009  21     0.001 196
CM                      -0.001     0.044 290     0.004 293     0.000 287     0.013 329     0.002 137     0.000 129     0.002 143     0.004 177     0.001 357

DCP 1       .010         5.217     1.956 347     0.246  31     0.109 139     0.186  52     0.066 112     0.099  14     0.022  42     0.021 338     0.004 192
DCP 2       .020         4.278     1.902 354     0.113  13     0.031 323     0.076 100     0.023 173     0.019  49     0.009 193     0.020 138     0.002 127
DCP 3       .030         4.000     1.649 353     0.090   4     0.033 321     0.040 103     0.012 138     0.003  66     0.004 242     0.014 100     0.010 189
DCP 4       .049         3.294     1.331 356     0.087  13     0.026  26     0.036 111     0.007 249     0.001 337     0.008 186     0.009 100     0.006 206
DCP 5       .074         2.856     1.057 358     0.078  18     0.015  15     0.036 106     0.010 162     0.008 288     0.001 229     0.007  29     0.004 354
DCP 6       .099         2.606     0.888   0     0.075  28     0.019   3     0.043 106     0.008 223     0.009 300     0.003 205     0.010 282     0.003 189
DCP 7       .149         1.910     0.669   5     0.062  27     0.013   4     0.035 135     0.007 341     0.004 252     0.002 116     0.020   6     0.008 313
DCP 8       .200         1.503     0.547  16     0.043  48     0.013  28     0.032 116     0.010 162     0.004  20     0.002  76     0.012 142     0.011 125
DCP 9       .250         1.323     0.491  17     0.032  42     0.009  18     0.057 128     0.010 231     0.006  61     0.013 304     0.011 173     0.008 155
DCP10       .300         1.203     0.401  21     0.045  31     0.012 355     0.053 128     0.009 283     0.010 239     0.005 355     0.013 123     0.010 359
DCP11       .399         1.027     0.346  38     0.032  59     0.014  51     0.054 136     0.013 278     0.008 143     0.002  17     0.012  82     0.009 322
DCP12       .501         0.710     0.286  46     0.037  75     0.009  56     0.049 149     0.005 354     0.004 188     0.015 322     0.015  35     0.007 273
DCP13       .600         0.562     0.237  58     0.032  81     0.003  63     0.052 144     0.009  41     0.007 161     0.006 297     0.017  36     0.008 146
DCP14       .701         0.402     0.203  71     0.025  84     0.008  87     0.055 145     0.008 311     0.004 167     0.014 313     0.014   1     0.015 174
DCP15       .800         0.248     0.157  79     0.018  90     0.002 168     0.054 139     0.012 297     0.007 157     0.009 344     0.015   5     0.005 143
DCP16       .900        -0.009     0.086  87     0.009 125     0.006 186     0.049 154     0.008  46     0.019   3     0.013 344     0.045 326     0.003 299
DCP17       .969        -0.017     0.039 104     0.004   1     0.008 324     0.037 139     0.020 276     0.016 305     0.007 244     0.013 124     0.009   0
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                                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                      TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                       0.0           46.03         0.353         0.196         5.20          0.0           12.48        12005.6         20

                      V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
                       66.4          11558.        0.32E 07     -0.048         1.571         17.74        -0.00121       0.689         0.0
                      (218.0)       (241.4)
                                                                          HARMONIC ANALYSIS
DATA
TYPE        X/C          RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                   12.470     5.195   0     0.304   2     0.079 297     0.031  74     0.037  85     0.016  57     0.030 223     0.012 271     0.007 115
CN                       1.163     0.410  20     0.034  85     0.006  54     0.036 102     0.007 293     0.002 264     0.007 263     0.007 252     0.005 108
CM                       0.002     0.031 203     0.016 201     0.001  76     0.008 204     0.002 161     0.001 103     0.002 118     0.003  57     0.002 285

DCP 1       .010         5.715     1.988  13     0.675 336     0.354 101     0.135 131     0.024 278     0.118 177     0.030 101     0.038 162     0.017 253
DCP 2       .020         4.897     1.726   7     0.376 347     0.126 104     0.115  74     0.039 275     0.005 105     0.008 270     0.021 123     0.006 303
DCP 3       .030         4.710     1.697 357     0.093 347     0.038  47     0.016 123     0.015 111     0.005 298     0.012 179     0.017 124     0.005 150
DCP 4       .049         3.693     1.385  13     0.291 318     0.111 149     0.009  54     0.043 237     0.019 130     0.014 219     0.010 100     0.016  39
DCP 5       .074         3.169     1.154  14     0.183 300     0.110 121     0.061  14     0.034 208     0.010 116     0.007 251     0.014  68     0.011 358
DCP 6       .099         2.865     0.999  15     0.130 285     0.104  93     0.028   9     0.035 178     0.010  19     0.012 234     0.015  28     0.014   2
DCP 7       .149         2.165     0.819  12     0.083 215     0.092  52     0.014 215     0.015 126     0.003 315     0.020 205     0.026  12     0.010 163
DCP 8       .200         1.879     0.727   7     0.122 165     0.103  25     0.046 104     0.021 120     0.027 204     0.020 165     0.007 169     0.004 330
DCP 9       .250         1.575     0.568   4     0.140 118     0.100 338     0.067 126     0.019 357     0.025 283     0.010 155     0.037 348     0.021 171
DCP10       .300         1.401     0.463   8     0.116 104     0.074 303     0.071 115     0.036 323     0.021 244     0.009 243     0.019 197     0.006 128
DCP11       .399         1.173     0.374  27     0.101  99     0.036 275     0.070  98     0.036 298     0.014  95     0.016 333     0.030 269     0.008 175
DCP12       .501         0.798     0.303  37     0.079  91     0.014 249     0.042  84     0.014 231     0.006  75     0.012 305     0.017 261     0.011  71
DCP13       .600         0.604     0.265  48     0.071  98     0.009 245     0.039  88     0.002 231     0.006  18     0.005 316     0.020 276     0.010  90
DCP14       .701         0.496     0.220  64     0.059  82     0.015 147     0.031 110     0.007 279     0.004 251     0.007 296     0.035 208     0.005 150
DCP15       .800         0.253     0.155  70     0.034  93     0.018 148     0.021 123     0.013   5     0.009  95     0.018 234     0.015 170     0.007  66
DCP16       .900         0.009     0.080  71     0.020  68     0.023  83     0.035  92     0.010   7     0.010 307     0.010  19     0.014 115     0.012 115
DCP17       .969        -0.012     0.035  36     0.011  68     0.007 162     0.031 113     0.008  27     0.005 288     0.020 260     0.035 340     0.008 253
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
            0.0         46.19       0.351        0.198        5.20        0.0          15.02       12005.7       20

          V           Q            RN           CN(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
           67.1        11779.       0.32E 07    -0.206        1.808       19.60        0.00170     -0.972         0.0
          (220.1)     (246.0)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.024   5.196   0   0.311 356   0.039 288   0.038 194   0.026  80   0.013  49   0.019 193   0.010 136   0.010 186
CN                1.225   0.621   5   0.195 147   0.053 342   0.027 286   0.021 355   0.025 195   0.015  41   0.014 269   0.009 308
CM               -0.032   0.054 105   0.065 285   0.031 111   0.003  11   0.009 191   0.005 351   0.005 182   0.008  37   0.002 195

DCP 1   .010      4.694   2.152  58   0.563 354   0.422 333   0.445 241   0.198 204   0.143 106   0.077 339   0.107 309   0.026 233
DCP 2   .020      4.192   2.207  43   0.427 327   0.183   2   0.178 250   0.076 178   0.101 106   0.063   8   0.043 299   0.012 169
DCP 3   .030      4.069   2.181  36   0.569 300   0.104 164   0.102  94   0.144 322   0.104 183   0.049  85   0.082 358   0.083 244
DCP 4   .049      3.520   1.792  33   0.510 302   0.169 168   0.042  84   0.078  29   0.072 270   0.054 165   0.025  31   0.004 207
DCP 5   .074      3.083   1.638  28   0.447 275   0.162 137   0.071  66   0.098 352   0.081 240   0.039 132   0.022  51   0.033   0
DCP 6   .099      2.808   1.486  24   0.361 253   0.114 123   0.097  76   0.125 335   0.083 220   0.047 121   0.036  26   0.020 315
DCP 7   .149      2.257   1.362  12   0.380 220   0.116 117   0.138  38   0.097 302   0.086 216   0.061 112   0.040  44   0.055 319
DCP 8   .200      1.971   1.230   7   0.360 210   0.141 118   0.130  23   0.087 306   0.077 199   0.045  90   0.048  24   0.030 312
DCP 9   .250      1.713   1.072 356   0.390 176   0.183  71   0.188 327   0.116 227   0.076 134   0.062  41   0.058 324   0.042 228
DCP10   .300      1.560   0.920 351   0.400 162   0.197  45   0.187 292   0.083 184   0.064 106   0.067 338   0.029 247   0.020 172
DCP11   .399      1.321   0.742 351   0.408 150   0.211  19   0.166 268   0.086 139   0.062  16   0.038 260   0.029 238   0.016  11
DCP12   .501      0.934   0.529 348   0.352 130   0.182 346   0.136 225   0.109  83   0.075 288   0.015 178   0.012  82   0.025 308
DCP13   .600      0.711   0.376 344   0.306 114   0.169 322   0.087 205   0.099  53   0.079 256   0.035 108   0.057 315   0.019 186
DCP14   .701      0.572   0.257 328   0.289  95   0.177 282   0.071 137   0.099 348   0.081 184   0.048  43   0.065 246   0.021  87
DCP15   .800      0.358   0.168 300   0.213  87   0.175 264   0.070  62   0.072 323   0.048 147   0.044 349   0.063 205   0.026  18
DCP16   .900      0.108   0.069 301   0.124  75   0.100 243   0.046  41   0.045 298   0.054 106   0.023 326   0.045 161   0.011 289
DCP17   .969      0.044   0.034 285   0.062  73   0.051 241   0.031 339   0.019 321   0.006 201   0.009  46   0.003 198   0.016 298

                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
            0.0         46.05       0.348        0.199        5.17        0.0          17.50       12005.8       20

          V           Q            RN           CN(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                                    0.32E 07    -0.351        2.143       22.87        0.00381     -2.189         0.0
           67.3        11874.
          (220.8)     (248.0)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.501   5.173   0   0.340 353   0.066 237   0.062 214   0.030  70   0.014  47   0.026 195   0.006 112   0.006 104
CN                1.330   0.751  15   0.182 215   0.060  79   0.040 194   0.026  88   0.015 329   0.010 282   0.005 299   0.005 187
CM               -0.079   0.127 122   0.093 323   0.034 190   0.014  75   0.008 341   0.003 181   0.005  39   0.003 225   0.000  75

DCP 1   .010      4.407   2.628  85   0.600 355   0.366   9   0.081  81   0.284 347   0.158 297   0.152 222   0.124 150   0.074 100
DCP 2   .020      3.986   2.625  71   0.731 346   0.219 315   0.279 180   0.096  70   0.096   9   0.098 300   0.102 225   0.090 160
DCP 3   .030      3.828   2.423  67   0.705 345   0.332 310   0.379 210   0.148 142   0.159 119   0.177  41   0.132 339   0.114 275
DCP 4   .049      3.393   2.148  60   0.813 328   0.272 262   0.330 193   0.200 123   0.101  50   0.084  20   0.078 306   0.042 245
DCP 5   .074      3.005   1.880  53   0.656 314   0.248 248   0.291 177   0.184 105   0.116  36   0.091   2   0.097 278   0.049 201
DCP 6   .099      2.771   1.691  47   0.539 303   0.225 234   0.262 168   0.173 100   0.106  18   0.080 348   0.088 265   0.049 190
DCP 7   .149      2.250   1.553  34   0.552 284   0.279 203   0.228 144   0.182  72   0.095 334   0.074 315   0.067 236   0.025 152
DCP 8   .200      1.988   1.450  29   0.570 276   0.304 185   0.215 146   0.187  56   0.092 315   0.067 303   0.080 189   0.042 145
DCP 9   .250      1.757   1.335  18   0.589 253   0.383 150   0.230  90   0.267   5   0.184 275   0.105 214   0.098 133   0.077  63
DCP10   .300      1.612   1.171  12   0.535 236   0.346 128   0.166  61   0.181 331   0.143 231   0.075 163   0.077  66   0.018  38
DCP11   .399      1.466   1.041   5   0.542 218   0.407 106   0.204   8   0.168 275   0.113 175   0.058 113   0.070  29   0.060 313
DCP12   .501      1.169   0.910 350   0.546 193   0.383  73   0.238 321   0.188 210   0.098 104   0.058  37   0.080 301   0.045 213
DCP13   .600      0.948   0.721 334   0.495 164   0.307  35   0.215 275   0.170 162   0.106  50   0.059 318   0.053 222   0.025 121
DCP14   .701      0.758   0.523 318   0.452 133   0.273 352   0.199 223   0.133 103   0.070 334   0.049 251   0.023  87   0.021  33
DCP15   .800      0.513   0.368 302   0.332 117   0.196 322   0.148 198   0.125  69   0.066 279   0.029 162   0.008 245   0.027  40
DCP16   .900      0.244   0.203 297   0.205  96   0.138 287   0.084 158   0.025  47   0.032 301   0.033 192   0.027  10   0.037 207
DCP17   .969      0.152   0.178 284   0.199  85   0.156 270   0.109 102   0.080 258   0.066  64   0.064 258   0.056 [illegible] [illegible]
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                       FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0        45.90       0.347       0.199      5.14        0.0        19.91       12005.9      20

          V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX AERO DAMP   TDR         EXT DAMP
           67.5        11956.      0.32E 07   -0.386      2.295       25.15      0.00338     -1.950       0.0
          (221.6)     (249.7)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            19.910   5.130   0   0.362 359   0.097 257   0.069 276   0.036  74   0.012  88   0.028 109   0.015 286   0.003  72
CN                1.386   0.751  27   0.204 276   0.062 149   0.050 246   0.007 243   0.017 157   0.008  28   0.011 194   0.011 359
CM               -0.116   0.141 142   0.084   9   0.028 256   0.007 154   0.015 125   0.008 345   0.008 142   0.010  21   0.004 195

DCP 1    .010     3.769   2.339  95   0.715  41   0.230  58   0.069 149   0.130  94   0.134  50   0.124  11   0.113 335   0.098 301
DCP 2    .020     3.599   2.309  85   0.802  23   0.200 342   0.240 257   0.121 100   0.060 141   0.062  87   0.062  81   0.061  17
DCP 3    .030     3.535   2.125  85   0.757  19   0.334   0   0.308 283   0.153 246   0.136 202   0.119 175   0.122 143   0.083  96
DCP 4    .049     3.178   2.039  79   0.729   7   0.241 343   0.360 275   0.161 224   0.089 173   0.099 150   0.070  98   0.013  88
DCP 5    .074     2.853   1.795  68   0.675 354   0.229 313   0.338 264   0.204 200   0.097 160   0.129 132   0.097  91   0.031  67
DCP 6    .099     2.641   1.597  60   0.632 343   0.205 297   0.307 254   0.182 196   0.099 161   0.127 109   0.095  70   0.034  28
DCP 7    .149     2.167   1.402  48   0.630 330   0.206 260   0.251 235   0.170 157   0.073 132   0.088  63   0.050  29   0.042   6
DCP 8    .200     2.034   1.385  44   0.716 326   0.295 295   0.259 229   0.202 149   0.109 106   0.100  72   0.070   9   0.087 348
DCP 9    .250     1.852   1.283  34   0.709 303   0.340 216   0.304 178   0.239  96   0.153  37   0.147 356   0.099 304   0.070 270
DCP10    .300     1.729   1.134  27   0.634 288   0.346 191   0.250 165   0.191  58   0.101 344   0.075 286   0.049 240   0.049 226
DCP11    .399     1.598   1.064  19   0.621 273   0.406 173   0.228 101   0.185  13   0.121 303   0.082 235   0.051 226   0.054 149
DCP12    .501     1.280   0.936   4   0.540 262   0.392 139   0.209  40   0.166 328   0.096 247   0.067 175   0.042 168   0.033  41
DCP13    .600     1.052   0.782 348   0.456 210   0.333 100   0.203 346   0.158 265   0.078 192   0.041  94   0.021 282   0.025 284
DCP14    .701     0.875   0.587 337   0.394 181   0.257  63   0.219 303   0.117 205   0.053 117   0.008 331   0.017 274   0.013 230
DCP15    .800     0.626   0.385 332   0.263 161   0.182  40   0.187 276   0.068 165   0.043  70   0.024 273   0.029 117   0.009 109
DCP16    .900     0.371   0.302 312   0.262 130   0.181 322   0.104 171   0.075 299   0.081 137   0.092 335   0.086 172   0.069  13
DCP17    .969     0.238   0.280 301   0.277 121   0.233 320   0.164 168   0.132 344   0.110 177   0.092   7   0.077 226   0.037  19

                       FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

          TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0        60.67       0.403       0.212      5.91        0.0         0.02       12007.1      20

          V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX AERO DAMP   TDR         EXT DAMP
           72.4        13406.      0.34E 07   -0.086      0.552        4.12      -0.00119     0.758       0.0
          (237.4)     (280.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.015   5.906   0   0.507 344   0.136 196   0.066 132   0.026 123   0.016 109   0.023 251   0.016  72   0.017  68
CN                0.141   0.357  34   0.036  54   0.022 294   0.001 176   0.015 262   0.000 146   0.003 184   0.006 155   0.001 295
CM               -0.023   0.058 295   0.008 310   0.006 134   0.002 182   0.005  85   0.001 117   0.002 350   0.002 327   0.000  93

DCP 1    .010    -0.534   2.494 348   0.248   1   0.049 131   0.007 165   0.025 155   0.014  92   0.011 304   0.001 182   0.011 251
DCP 2    .020    -0.337   1.791 358   0.168 356   0.011 217   0.026 229   0.019 221   0.009 143   0.016 316   0.014 123   0.010 251
DCP 3    .030     0.049   1.492 358   0.124 349   0.025 231   0.006 163   0.020 193   0.009 231   0.013  76   0.014 141   0.008 203
DCP 4    .049    -0.023   1.218   1   0.094   2   0.018 228   0.003 241   0.016 179   0.003 139   0.001  53   0.009 227   0.004 124
DCP 5    .074     0.160   0.987   3   0.085   5   0.020 249   0.019 159   0.006 231   0.004 167   0.008 295   0.003 156   0.009 172
DCP 6    .099     0.370   0.850   8   0.079  15   0.030 280   0.025 154   0.008 265   0.010 200   0.007 327   0.007 131   0.010 253
DCP 7    .149     0.236   0.655  15   0.073  32   0.022 272   0.011 131   0.014 275   0.019 107   0.015 255   0.007 357   0.010  39
DCP 8    .200     0.252   0.562  27   0.077  42   0.026 291   0.018 272   0.011 272   0.006   1   0.012 121   0.008 245   0.022 190
DCP 9    .250     0.195   0.491  30   0.052  43   0.034 293   0.020 203   0.011 192   0.011 149   0.012  87   0.014 123   0.007 187
DCP10    .300     0.211   0.420  36   0.042  43   0.017 258   0.013 212   0.014 257   0.000 257   0.004 220   0.010 161   0.010 347
DCP11    .399     0.220   0.398  56   0.043  65   0.029 292   0.007 232   0.023 292   0.010 298   0.010 272   0.006 188   0.019  72
DCP12    .501     0.141   0.356  65   0.044  78   0.027 289   0.008  77   0.019 270   0.006  47   0.009 320   0.010 314   0.009   3
DCP13    .600     0.209   0.319  73   0.057  85   0.030 300   0.014  78   0.031 273   0.011  39   0.013  21   0.025 175   0.020 298
DCP14    .701     0.201   0.257  79   0.031 122   0.023 305   0.011  36   0.012 253   0.005 255   0.017 132   0.011  83   0.008 192
DCP15    .800     0.097   0.192  95   0.030 116   0.018 326   0.007 1[illegible]   0.015 269   0.012 230   0.016 167   0.014 125   0.010  87
DCP16    .900    -0.073   0.103 108   0.029 127   0.030 294   0.025 31[illegible]   0.016 238   0.015 206   0.016 215   0.010 245   0.015 295
DCP17    .969     0.010   0.061 153   0.035 241   0.032   3   0.018 17[illegible]   0.021 255   0.027  28   0.016 160   0.024 121   0.024 164
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0       68.58      0.499      0.205      5.95       0.0          2.52      12007.2      20

                 V          Q          RN         CN(MIN)    CN(MAX)    ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                  70.0       12654.     0.33E 07  -0.088      0.759       6.64      -0.00123     0.757       0.0
                 (229.4)    (264.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.520    5.946   0   0.511 345   0.150 189   0.072 136   0.006 129   0.019  14   0.016 227   0.025 123   0.002 123
CN                 0.365    0.356  36   0.048  63   0.011 310   0.006 286   0.006 239   0.008  42   0.003  63   0.004 157   0.003 101
CM                -0.020    0.062 300   0.012 301   0.005 171   0.004 158   0.002  92   0.003 257   0.001  90   0.001 268   0.001 314

DCP 1     .010     0.957    2.371 349   0.238 356   0.064 180   0.019 136   0.028 185   0.008   0   0.018 324   0.012 300   0.021  60
DCP 2     .020     0.756    1.840 356   0.177   3   0.026 228   0.015 226   0.034 184   0.017 353   0.021  45   0.007 132   0.010  16
DCP 3     .030     0.974    1.535 356   0.152 359   0.025 265   0.009 257   0.014 167   0.008 247   0.007 181   0.018  96   0.011   4
DCP 4     .049     0.762    1.284   1   0.116 359   0.023 241   0.019 223   0.016 184   0.016 294   0.028  84   0.013 264   0.010 186
DCP 5     .074     0.812    1.018   4   0.103   8   0.032 222   0.020 176   0.016 248   0.017 313   0.011  58   0.015 193   0.002 204
DCP 6     .099     0.934    0.860   9   0.095  12   0.026 239   0.010 192   0.018 225   0.015 310   0.019  49   0.021 241   0.006 177
DCP 7     .149     0.665    0.656  16   0.083  32   0.027 201   0.012 233   0.010 241   0.014 344   0.019  97   0.008 161   0.015 281
DCP 8     .200     0.581    0.559  29   0.068  38   0.024 259   0.013 237   0.000  94   0.025   7   0.007  34   0.009  60   0.025  71
DCP 9     .250     0.473    0.508  28   0.068  45   0.005   9   0.012 223   0.013 213   0.009 339   0.012 188   0.021 177   0.011 333
DCP10     .300     0.471    0.459  33   0.063  53   0.018 280   0.013 213   0.007   9   0.002  49   0.015 149   0.005 217   0.012 100
DCP11     .399     0.425    0.399  54   0.064  75   0.011 353   0.016 268   0.006 176   0.006 312   0.010  16   0.009 157   0.007  96
DCP12     .501     0.277    0.359  67   0.069  87   0.015 345   0.008 241   0.008  55   0.012  96   0.001  35   0.006 350   0.010 155
DCP13     .600     0.322    0.311  77   0.061 108   0.013 352   0.005 357   0.004 175   0.021  84   0.011   1   0.014 219   0.006 117
DCP14     .701     0.277    0.271  88   0.062  92   0.025 339   0.015  27   0.026 276   0.021  77   0.002 342   0.009 118   0.003 343
DCP15     .800     0.147    0.220 102   0.063 127   0.025 336   0.01[illegible] 352   0.024 249   0.016  45   0.006  76   0.013  56   0.008 327
DCP16     .900    -0.051    0.129 127   0.034 102   0.015 356   0.029 341   0.006 188   0.013  70   0.007 328   0.012 169   0.026 176
DCP17     .969     0.007    0.051 169   0.025 202   0.010 344   0.022 286   0.010 291   0.012 248   0.032 222   0.022  26   0.025  18

                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0       68.48      0.511      0.201      5.93       0.0          5.05      12007.3      20

                 V          Q          RN         CN(MIN)    CN(MAX)    ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                  68.3       12099.     0.32E 07  -0.082      1.019       8.71      -0.00128     0.772       0.0
                 (224.0)    (252.7)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              5.053    5.929   0   0.519 345   0.149 185   0.065 136   0.021 349   0.024  20   0.017 188   0.023 129   0.011 112
CN                 0.593    0.372  36   0.050  61   0.021 347   0.011 257   0.003 312   0.004 359   0.005 263   0.004 195   0.002  43
CM                -0.015    0.063 299   0.013 288   0.008 193   0.004 116   0.001 253   0.001 197   0.001  82   0.001  14   0.001 252

DCP 1     .010     2.538    2.458 349   0.218 327   0.092 179   0.037  86   0.032 226   0.014  73   0.021 303   0.011 172   0.012 325
DCP 2     .020     1.940    1.893 358   0.168   4   0.031 226   0.012 105   0.018 231   0.002 176   0.009 314   0.012  27   0.019  10
DCP 3     .030     1.977    1.608 358   0.137   3   0.023 222   0.018 113   0.023 235   0.008  92   0.012 333   0.006  26   0.006 349
DCP 4     .049     1.606    1.321   1   0.112 359   0.024 235   0.022 175   0.017 274   0.004 299   0.009 102   0.006 344   0.012 241
DCP 5     .074     1.483    1.044   4   0.101   4   0.024 237   0.021 107   0.018 265   0.009  93   0.011  26   0.007 104   0.003 160
DCP 6     .099     1.481    0.885  10   0.088  14   0.028 288   0.019 182   0.009 291   0.006 282   0.005  21   0.005 322   0.004 281
DCP 7     .149     1.071    0.697  17   0.062  32   0.014 292   0.013 229   0.010 262   0.015 292   0.017 231   0.001 148   0.005 134
DCP 8     .200     0.916    0.593  29   0.067  44   0.039 293   0.019 236   0.017 313   0.009 297   0.013 163   0.007 264   0.011  57
DCP 9     .250     0.753    0.512  32   0.077  51   0.021 313   0.017 156   0.018 312   0.005 101   0.015 224   0.009 179   0.011 195
DCP10     .300     0.718    0.463  37   0.062  42   0.020 321   0.013 247   0.002 201   0.012  69   0.009 341   0.025 162   0.015 298
DCP11     .399     0.625    0.426  56   0.063  74   0.028 348   0.024 284   0.011  16   0.002 259   0.004 129   0.012 219   0.009  49
DCP12     .501     0.431    0.369  67   0.069  89   0.044 359   0.020 259   0.006 251   0.011 324   0.007 334   0.006 284   0.003 222
DCP13     .600     0.417    0.326  78   0.074  87   0.040   4   0.026 240   0.005 155   0.010 295   0.017 254   0.007 349   0.015 317
DCP14     .701     0.362    0.270  86   0.062  89   0.021  11   0.021 282   0.010  39   0.001   4   0.011 297   0.003 209   0.021  77
DCP15     .800     0.182    0.216 101   0.044  98   0.026   7   0.010 254   0.011  39   0.005 108   0.013 257   0.011  62   0.003 251
DCP16     .900    -0.031    0.130 121   0.024 121   0.032 352   0.015   5   0.012   8   0.026  58   0.011 127   0.014 232   0.030 151
DCP17     .969    -0.006    0.036 139   0.028 127   0.039  62   0.022 352   0.031 179   0.021 291   0.008 304   0.023 169   0.037   4
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ   K            MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        68.50      0.511        0.201     5.93        0.0        7.54     12007.4       20

              V          Q          RN           CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                68.3       12104.     0.32E 07   -0.094      1.241      11.64     -0.00143    0.868       0.0
              (224.1)    (252.8)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.542   5.930   0   0.509 344   0.159 186   0.062 129   0.026 353   0.020  12   0.022 192   0.024 114   0.005 198
CN                 0.806   0.385  38   0.057  67   0.016 288   0.012 246   0.007 288   0.005 299   0.004 325   0.003  97   0.002  95
CM                -0.010   0.068 294   0.014 296   0.003 118   0.003  58   0.000 349   0.002 138   0.001 115   0.001 225   0.000 222

DCP 1     .010     3.849   2.174 348   0.300  35   0.157 333   0.082 230   0.051 240   0.055 207   0.021 144   0.020 120   0.015  69
DCP 2     .020     3.092   1.903 358   0.173   3   0.012 210   0.021 170   0.030 288   0.022 116   0.019  11   0.010 252   0.012 294
DCP 3     .030     2.932   1.611 358   0.144   2   0.009 187   0.012 163   0.018 282   0.003  46   0.004 105   0.015 192   0.002 222
DCP 4     .049     2.418   1.327   0   0.132   7   0.005  35   0.003   2   0.026 282   0.005 133   0.006 359   0.011 206   0.017  74
DCP 5     .074     2.140   1.062   4   0.107  14   0.006 211   0.004 353   0.021 286   0.004 192   0.010 289   0.018 146   0.012  54
DCP 6     .099     2.012   0.905   9   0.092  22   0.019 293   0.003 354   0.018 271   0.009 108   0.009 352   0.025 153   0.013  77
DCP 7     .149     1.474   0.697  16   0.093  40   0.021 292   0.021 273   0.010 343   0.010 352   0.010  53   0.006 112   0.007 144
DCP 8     .200     1.236   0.596  30   0.076  54   0.008  17   0.001 161   0.018 308   0.012 355   0.016 343   0.005 233   0.011 151
DCP 9     .250     1.029   0.533  33   0.077  48   0.031 245   0.009 270   0.011 300   0.015 297   0.002 359   0.011  32   0.004  84
DCP10     .300     0.946   0.455  39   0.058  50   0.029 238   0.014 255   0.012 259   0.015 249   0.002  78   0.015  28   0.010 130
DCP11     .399     0.815   0.441  59   0.073  76   0.027 286   0.013 275   0.010  37   0.013 256   0.005 350   0.010  75   0.006 211
DCP12     .501     0.574   0.406  66   0.072  93   0.020 291   0.025 258   0.012 287   0.004 145   0.012 282   0.008 216   0.006 234
DCP13     .600     0.507   0.362  76   0.069  98   0.022 285   0.015 231   0.005 262   0.013  73   0.005 276   0.011 168   0.003 289
DCP14     .701     0.422   0.297  86   0.051  87   0.013 298   0.023 232   0.006 261   0.018 280   0.003 159   0.007 292   0.008  20
DCP15     .800     0.225   0.220  97   0.059 107   0.021 303   0.012 219   0.001  38   0.004 293   0.002  67   0.009  64   0.011   6
DCP16     .900    -0.018   0.150 110   0.044 121   0.006 255   0.007 153   0.010 105   0.021 328   0.027 331   0.017  67   0.014 158
DCP17     .969    -0.012   0.077 132   0.025 122   0.018  36   0.014 309   0.010 268   0.011 351   0.018 194   0.004 335   0.011  40

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ   K            MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        68.15      0.513        0.199     5.93        0.0       10.04     12007.5       20

              V          Q          RN           CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                67.7       11917.     0.32E 07   -0.077      1.482      13.68     -0.00148    0.890       0.0
              (222.1)    (248.9)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             10.036   5.927   0   0.500 344   0.156 183   0.067 117   0.046 346   0.018  12   0.030 185   0.020 136   0.005 185
CN                 1.016   0.386  39   0.063  57   0.021 309   0.009 295   0.010 349   0.008 271   0.006 151   0.002 201   0.006 126
CM                -0.005   0.069 293   0.013 275   0.006 157   0.004  96   0.003 195   0.004  87   0.003 334   0.001  45   0.002 318

DCP 1     .010     5.097   1.942 348   0.287  18   0.143 160   0.166  43   0.029 135   0.080  16   0.031 357   0.032   3   0.015 330
DCP 2     .020     4.206   1.874 358   0.177   8   0.040 262   0.022  60   0.023 276   0.024   7   0.008 111   0.012 161   0.009 142
DCP 3     .030     3.881   1.610 358   0.148   3   0.042 275   0.012  72   0.023 271   0.006 356   0.004 149   0.008 127   0.003 318
DCP 4     .049     3.236   1.323   1   0.128  12   0.015 295   0.015 203   0.014 315   0.019 156   0.010 349   0.012 180   0.002  75
DCP 5     .074     2.789   1.047   4   0.099  21   0.024 243   0.007 230   0.016 236   0.014 148   0.011  45   0.006 175   0.017 120
DCP 6     .099     2.541   0.885   9   0.092  27   0.023 258   0.015 198   0.011 309   0.001  97   0.003  20   0.014 191   0.015 119
DCP 7     .149     1.884   0.697  16   0.088  41   0.018 313   0.017 176   0.013 297   0.004 339   0.005 333   0.002  17   0.013 319
DCP 8     .200     1.562   0.583  28   0.082  51   0.027 283   0.004 196   0.015 331   0.008 195   0.007 269   0.015 168   0.006 327
DCP 9     .250     1.309   0.552  31   0.073  40   0.020 250   0.010  96   0.024 333   0.005 184   0.001   7   0.021 268   0.017  48
DCP10     .300     1.170   0.472  37   0.065  53   0.022 273   0.005 320   0.010 306   0.003 207   0.007 106   0.011  61   0.008  43
DCP11     .399     0.984   0.449  59   0.075  73   0.039 312   0.026 342   0.011  17   0.013 266   0.005 126   0.003 324   0.012 127
DCP12     .501     0.707   0.400  68   0.062  67   0.028 322   0.022 325   0.013  49   0.013 309   0.015 206   0.005  47   0.018 177
DCP13     .600     0.591   0.344  79   0.070  69   0.037 313   0.018 298   0.018 332   0.016 266   0.017 182   0.007  59   0.038 186
DCP14     .701     0.486   0.312  86   0.068  90   0.019 346   0.025 261   0.017  19   0.020 267   0.011  89   0.004 190   0.008  75
DCP15     .800     0.256   0.244  97   0.056  92   0.029 328   0.008 286   0.013 291   0.017 278   0.019 140   0.008 211   0.009  46
DCP16     .900     0.005   0.152 103   0.039  85   0.022 346   0.040 244   0.016  61   0.009 277   0.010 132   0.013 255   0.009 173
DCP17     .969    -0.003   0.060 112   0.016  55   0.011  32   0.020  53   0.029  14   0.010 193   0.010 207   0.006 147   0.017 118
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                           FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K             MACH NO      DFL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         67.57        0.508         0.199        5.90         0.0          12.52       12007.6       20

                 V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                  67.7         11937.       0.32E 07     -0.070        1.587        16.55       -0.00130      0.762        0.0
                 (222.2)      (249.3)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              12.520    5.902   0    0.496 343    0.151 184    0.057 120    0.043 334    0.019  60    0.024 161    0.011 103    0.005 261
CN                  1.155    0.360  35    0.056  64    0.013 297    0.010 307    0.006   9    0.001 110    0.012 142    0.001  59    0.002 136
CM                 -0.002    0.060 294    0.016 279    0.004 129    0.005 129    0.003 266    0.001 215    0.003 325    0.001 163    0.003  42

DCP 1     .010      5.831    1.597 359    0.485 340    0.213 174    0.145 170    0.033 170    0.070 170    0.026 172    0.013  72    0.048 208
DCP 2     .020      4.974    1.737   1    0.291   2    0.049 222    0.035  81    0.038 290    0.004 267    0.016  43    0.010  40    0.008 195
DCP 3     .030      4.614    1.590 358    0.159   2    0.008 236    0.004 304    0.032 262    0.005  56    0.016   1    0.007 143    0.014 337
DCP 4     .049      3.686    1.329   8    0.188 330    0.057 160    0.033  36    0.050 290    0.020 203    0.004  97    0.003  91    0.006  77
DCP 5     .074      3.142    1.089  10    0.119 332    0.036 139    0.016 343    0.022 274    0.019  99    0.007 105    0.016 189    0.013 154
DCP 6     .099      2.842    0.925  12    0.065 336    0.024  59    0.025 257    0.002 321    0.003 277    0.009  45    0.006 169    0.010 109
DCP 7     .149      2.148    0.733  14    0.025  12    0.021  13    0.013 234    0.017 281    0.005 105    0.007  59    0.012  85    0.005  64
DCP 8     .200      1.832    0.656  15    0.085 123    0.059   8    0.015 248    0.037 356    0.018 165    0.015 146    0.018 169    0.017  37
DCP 9     .250      1.515    0.511  25    0.114  73    0.054 298    0.012 131    0.035 333    0.023 180    0.017 124    0.003 234    0.009  29
DCP10     .300      1.350    0.451  31    0.105  73    0.047 279    0.019  87    0.018 352    0.037 324    0.015  95    0.008 137    0.008 123
DCP11     .399      1.117    0.399  53    0.096  84    0.027 276    0.011   9    0.013  77    0.029 327    0.043 152    0.011 318    0.014 161
DCP12     .501      0.803    0.357  64    0.080  84    0.020 262    0.022 317    0.010  98    0.036 204    0.018 174    0.014 291    0.013 144
DCP13     .600      0.638    0.337  76    0.055  83    0.017 289    0.034 311    0.006 101    0.017  42    0.015 208    0.004  75    0.009 355
DCP14     .701      0.507    0.288  85    0.065  79    0.006 330    0.034 297    0.003 226    0.006  90    0.008 161    0.007  84    0.011 282
DCP15     .800      0.262    0.221  97    0.052  98    0.020 358    0.015 318    0.007 359    0.006  73    0.039 143    0.010  19    0.038 336
DCP16     .900      0.036    0.118 112    0.049  95    0.028 251    0.017 261    0.022 111    0.017 202    0.026 114    0.003 346    0.008 175
DCP17     .969      0.000    0.064  91    0.020  34    0.017 105    0.011  60    0.021  57    0.015  31    0.018 348    0.007 176    0.016 110
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                           FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         67.31        0.504         0.200        5.90         0.0          15.07       12007.7       20

                 V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                  67.9         12018.       0.32E 07     -0.085        1.581        19.50       -0.00023      0.137        0.0
                 (222.9)      (251.0)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              15.072    5.897   0    0.397 337    0.116 194    0.065 148    0.063 359    0.021 116    0.007 152    0.020 188    0.012  15
CN                  1.219    0.397  11    0.112  86    0.006 273    0.018 326    0.012 237    0.012  73    0.008 176    0.006 333    0.005 156
CM                 -0.017    0.035 353    0.041 252    0.013  39    0.003 195    0.008  31    0.003 205    0.004 348    0.002 156    0.001 102

DCP 1     .010      4.957    1.902  52    0.739 343    0.443 283    0.321 193    0.087 135    0.099 305    0.042 252    0.032 207    0.020 350
DCP 2     .020      4.440    1.888  38    0.492 352    0.249 296    0.199 171    0.062  43    0.031  30    0.012 299    0.051 135    0.033  39
DCP 3     .030      4.241    1.880  26    0.255 301    0.117 331    0.093 152    0.019 211    0.073   2    0.061 191    0.028  55    0.045 347
DCP 4     .049      3.719    1.552  22    0.424 308    0.242 157    0.150  43    0.073 293    0.061 213    0.040 107    0.037  57    0.013 353
DCP 5     .074      3.165    1.402  19    0.348 274    0.249 118    0.143 357    0.086 258    0.049 158    0.041  44    0.024 327    0.023 167
DCP 6     .099      2.916    1.298  13    0.274 238    0.218  84    0.115 323    0.063 228    0.333 122    0.035  34    0.032 283    0.043 125
DCP 7     .149      2.335    1.148   1    0.258 181    0.155  68    0.133 328    0.100 219    0.062 113    0.037  26    0.021 296    0.028 144
DCP 8     .200      2.043    0.977 356    0.239 160    0.136  80    0.103 339    0.071 241    0.079 121    0.045  11    0.020 229    0.053 163
DCP 9     .250      1.763    0.779 342    0.320 123    0.135  22    0.114 271    0.049 152    0.054  32    0.337 268    0.029 168    0.033 111
DCP10     .300      1.536    0.577 339    0.296 103    0.109 342    0.074 233    0.054 110    0.037 336    0.047 218    0.022  51    0.007 176
DCP11     .399      1.248    0.347 347    0.337  97    0.137 316    0.053 159    0.050  38    0.011 239    0.037 188    0.022 350    0.014  10
DCP12     .501      0.871    0.164   6    0.234  77    0.111 269    0.035 134    0.064 343    0.027 134    0.012 134    0.012 253    0.013 208
DCP13     .600      0.653    0.096  45    0.198  66    0.086 241    0.048  53    0.045 269    0.023  45    0.008 231    0.017 114    0.017 297
DCP14     .701      0.471    0.097  96    0.167  58    0.085 206    0.040  23    0.037 245    0.023  72    0.019 222    0.032 354    0.019 239
DCP15     .800      0.295    0.152 124    0.120  54    0.078 170    0.040 333    0.023 142    0.021 355    0.023 158    0.025 306    0.007 141
DCP16     .900      0.145    0.122 117    0.070  36    0.047 157    0.027 291    0.026 177    0.001  43    0.036 126    0.022 259    0.009   5
DCP17     .969      0.046    0.051 125    0.033  61    0.024 140    0.002 306    0.023  76    0.017 342    0.011 343    0.032  83    0.013  74
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                           FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0      68.74      0.516      0.200      5.96        0.0         17.56       12007.8      20

                 V         C          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                  67.8      12023.     0.32E 07  -0.260      1.795       23.99       0.00106    -0.637       0.0
                 (222.6)   (251.1)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              17.561   5.962   0   0.486 331   0.130 203   0.053 115   0.051   1   0.024  58   0.025 176   0.016 125   0.005 311
CN                  1.325   0.562 359   0.133 102   0.036 266   0.034  55   0.016 253   0.017  25   0.011 188   0.009 161   0.007 324
CM                 -0.077   0.079  49   0.075 243   0.022  83   0.006 238   0.007  27   0.008 223   0.002 314   0.003  73   0.003  88

DCP 1     .010      4.289   2.481  55   0.357 359   0.285 331   0.286 317   0.231 257   0.147 211   0.100 116   0.118  47   0.106 345
DCP 2     .020      3.984   2.633  45   0.505 332   0.218 237   0.126  86   0.106   6   0.118 274   0.106 188   0.130 108   0.092  37
DCP 3     .030      3.817   2.447  39   0.571 335   0.423 254   0.215 154   0.185 104   0.184  10   0.118 317   0.121 243   0.094 182
DCP 4     .049      3.480   2.173  33   0.586 295   0.215 210   0.191 132   0.125  38   0.079 340   0.080 274   0.053 174   0.043 172
DCP 5     .074      3.045   1.912  25   0.410 277   0.232 198   0.204 102   0.119  24   0.091 324   0.092 254   0.068 145   0.064  86
DCP 6     .099      2.798   1.775  20   0.358 259   0.249 173   0.187  79   0.142 359   0.074 283   0.094 219   0.072 121   0.053  47
DCP 7     .149      2.311   1.621   5   0.384 231   0.241 143   0.179  67   0.145 330   0.065 249   0.093 168   0.075  64   0.081 348
DCP 8     .200      2.035   1.447   3   0.396 220   0.210 132   0.197  49   0.143 312   0.099 213   0.081 116   0.044  53   0.041 325
DCP 9     .250      1.789   1.236 347   0.443 177   0.265  80   0.283 347   0.206 229   0.119 139   0.106  55   0.073 312   0.061 199
DCP10     .300      1.601   1.043 341   0.437 156   0.258  42   0.226 296   0.160 185   0.113  76   0.064 318   0.036 238   0.019 100
DCP11     .399      1.393   0.760 336   0.537 140   0.295  11   0.168 252   0.112 146   0.101  36   0.050 279   0.078 175   0.025  15
DCP12     .501      1.109   0.543 316   0.585 108   0.299 312   0.139 166   0.068  56   0.063 321   0.062 154   0.017  70   0.032 254
DCP13     .600      0.902   0.305 283   0.529  81   0.281 270   0.160 113   0.078 324   0.035 199   0.021  87   0.006  57   0.018 227
DCP14     .701      0.752   0.218 232   0.444  48   0.209 231   0.135  75   0.088 260   0.053  80   0.030 264   0.009 234   0.008 358
DCP15     .800      0.555   0.207 186   0.316  22   0.132 206   0.087  14   0.047 169   0.035 359   0.029 164   0.014 209   0.014 260
DCP16     .900      0.248   0.107 157   0.180 357   0.078 198   0.082  12   0.061 154   0.039 354   0.042  50   0.015 261   0.024 325
DCP17     .969      0.163   0.126 187   0.161 344   0.076 109   0.049 228   0.055 335   0.049  70   0.042 211   0.031 295   0.017 142
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                           FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0      68.82      0.520      0.198      5.93        0.0         19.97       12007.9      20

                 V         Q          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                  67.3      11846.     0.32E 07  -0.314      2.081       25.96       0.00215    -1.284       0.0
                 (220.9)   (247.4)
                                                           HARMONIC ANALYSIS
DA A
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              19.973   5.931   0   0.532 332   0.100 210   0.060 138   0.045  19   0.015  46   0.018 193   0.019 132   0.003  41
CN                  1.442   0.654   7   0.058 157   0.031 331   0.034 176   0.008  16   0.019  86   0.004 107   0.013 339   0.011 265
CM                 -0.136   0.113  70   0.058 267   0.019 176   0.013  30   0.009 164   0.007 318   0.004  43   0.004 241   0.003  49

DCP 1     .010      3.621   2.723  67   0.629  52   0.237 319   0.138 358   0.237  28   0.170 356   0.137 283   0.154 247   0.125 178
DCP 2     .020      3.413   2.636  62   0.643  44   0.310 315   0.242 258   0.148 161   0.128  89   0.068  42   0.059 331   0.057 305
DCP 3     .030      3.346   2.527  57   0.634  26   0.423 304   0.213 262   0.266 199   0.183 147   0.167  94   0.127  67   0.136   3
DCP 4     .049      3.264   2.292  49   0.581 347   0.378 278   0.247 210   0.126 171   0.170 114   0.121  75   0.118  17   0.118 335
DCP 5     .074      2.902   2.029  39   0.510 326   0.413 253   0.279 175   0.133 125   0.160  69   0.080  17   0.106 327   0.088 274
DCP 6     .099      2.724   1.852  32   0.457 308   0.367 235   0.270 157   0.152  99   0.138  42   0.064 332   0.089 293   0.068 226
DCP 7     .149      2.307   1.759  20   0.517 286   0.321 214   0.291 136   0.120  67   0.147   4   0.091 297   0.102 219   0.089 147
DCP 8     .200      2.063   1.694  19   0.600 271   0.355 199   0.303 109   0.173  38   0.146 333   0.067 260   0.055 208   0.043 147
DCP 9     .250      1.900   1.552   7   0.651 234   0.405 144   0.354  51   0.210 316   0.146 247   0.089 166   0.067  74   0.077  20
DCP10     .300      1.767   1.363 359   0.594 213   0.385 104   0.299   3   0.188 263   0.114 185   0.077 118   0.067   4   0.075 302
DCP11     .399      1.596   1.052 350   0.610 186   0.422  64   0.261 316   0.126 207   0.079 127   0.047 103   0.055 312   0.038 233
DCP12     .501      1.313   0.766 329   0.587 144   0.415  13   0.252 243   0.107 124   0.050  26   0.028  17   0.020 175   0.021 122
DCP13     .600      1.143   0.529 301   0.522 109   0.371 336   0.225 194   0.065  68   0.028 341   0.021  19   0.015  25   0.031   3
DCP14     .701      0.967   0.353 259   0.428  74   0.273 290   0.131 126   0.043 327   0.018 184   0.010 139   0.006 263   0.033 270
DCP15     .800      0.745   0.268 216   0.302  47   0.196 253   0.093  80   0.035 232   0.002 351   0.034 129   0.016 225   0.017 286
DCP16     .900      0.417   0.254 199   0.255   4   0.077 160   0.081 170   0.094 332   0.080  91   0.054 231   0.043  28   0.036 172
DCP17     .969      0.336   0.393 211   0.344 351   0.229 122   0.188 248   0.144  24   0.112 159   0.089 286   0.072  82   0.018 208
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ       DRIVE HZ      K             MACH NO        DEL.ALPHA   DEL.H         ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0           23.12         0.113          0.308          5.14        0.0           0.03       12009.1        20

               V              Q             RN            CN(MIN)        CN(MAX)     ALPHA.NMAX    AERO DAMP    TDR          EXT DAMP
               104.4          28259.         0.49E 07     -0.039          0.567         5.24       -0.00083      0.702         0.0
              (342.5)        (550.2)
                                                                   HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                0.028    5.136   0    0.238   5    0.050 258    0.004 125    0.007  53    0.029  76    0.034 187    0.041 179    0.004 308
CN                   0.126    0.430 355    0.016   0    0.001 178    0.001  85    0.003 274    0.001  76    0.005 208    0.018 205    0.002  42
CM                  -0.018    0.013 303    0.001 352    0.001  19    0.000 273    0.001  98    0.001 178    0.002  25    0.007  15    0.001 201

DCP 1     .010      -0.632    3.105 347    0.226  31    0.049 116    0.014 188    0.003 207    0.012 121    0.002 300    0.022 312    0.012 167
DCP 2     .020      -0.331    2.265 350    0.089 349    0.008 358    0.003 259    0.002 253    0.012 144    0.007 347    0.018 324    0.011 187
DCP 3     .030      -0.015    1.868 350    0.072 333    0.008 331    0.004 268    0.003 262    0.006 132    0.002 244    0.013 328    0.006 191
DCP 4     .049       0.106    1.519 350    0.058 332    0.008 333    0.004 252    0.003 225    0.007 129    0.001  56    0.017 327    0.004 212
DCP 5     .074       0.276    1.217 350    0.047 344    0.002 302    0.002 242    0.004 174    0.007 136    0.002  36    0.015 324    0.004 173
DCP 6     .099       0.365    1.053 351    0.040 351    0.010 322    0.001 154    0.005 167    0.003  86    0.001 316    0.015 309    0.006 190
DCP 7     .149       0.231    0.786 352    0.033   4    0.003   3    0.005  31    0.004 305    0.005 164    0.006 301    0.010 300    0.007 153
DCP 8     .200       0.205    0.642 355    0.027 355    0.004  34    0.003 174    0.002 199    0.005 146    0.003 334    0.009 329    0.003 191
DCP 9     .250       0.175    0.559 354    0.027   3    0.001 230    0.003 127    0.004 268    0.001  83    0.008 179    0.027 192    0.004 338
DCP10     .300       0.190    0.466 355    0.019 359    0.002 205    0.005  38    0.006 256    0.003  38    0.006 179    0.019 188    0.002 202
DCP11     .399       0.183    0.374   0    0.012  14    0.004 158    0.004  36    0.009 295    0.003  63    0.009 203    0.030 200    0.004  11
DCP12     .501       0.120    0.283   4    0.009  11    0.006 149    0.001 309    0.003 311    0.001 249    0.006 222    0.024 201    0.003 104
DCP13     .600       0.151    0.219   6    0.008  34    0.003 170    0.004 223    0.004 284    0.003 306    0.008 197    0.027 203    0.005  26
DCP14     .701       0.195    0.155   6    0.004   6    0.003 235    0.002 172    0.002 350    0.003 280    0.007 200    0.028 194    0.006  40
DCP15     .800       0.096    0.093  14    0.001  61    0.000 292    0.003 110    0.004 353    0.003   9    0.009 215    0.027 201    0.005  23
DCP16     .900      -0.061    0.029  23    0.004 220    0.001 297    0.008  51    0.008 229    0.002 359    0.005 222    0.023 186    0.006  12
DCP17     .969      -0.028    0.019 195    0.004 200    0.006 206    0.008 228    0.004 141    0.008  67    0.012 196    0.028 205    0.003 351

                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ       DRIVE HZ      K             MACH NO        DEL.ALPHA   DEL.H         ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0           23.15         0.115          0.304          5.15        0.0           2.46       12009.2        20

               V              Q             RN            CN(MIN)        CN(MAX)     ALPHA.NMAX    AERO DAMP    TDR          EXT DAMP
               102.9          27617.         0.49E 07     -0.030          0.790         7.62       -0.00091      0.754         0.0
              (337.7)        (576.8)
                                                                   HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                2.455    5.155   0    0.233   6    0.049 261    0.005 203    0.015  24    0.011  89    0.023 166    0.006 142    0.006  21
CN                   0.358    0.434 355    0.019  14    0.002  42    0.002 353    0.001 276    0.001 265    0.001 134    0.004 161    0.003  14
CM                  -0.014    0.014 300    0.002 253    0.001 275    0.001 173    0.000 340    0.001 152    0.000 356    0.001 306    0.001 189

DCP 1     .010       1.005    2.898 347    0.118   8    0.007  29    0.003 163    0.011 291    0.010 181    0.004  25    0.007 217    0.015 302
DCP 2     .020       0.850    2.248 350    0.080 356    0.002 323    0.007  28    0.013 302    0.013 197    0.007 112    0.003 227    0.013 309
DCP 3     .030       0.969    1.905 350    0.068 354    0.027 331    0.002 118    0.013 317    0.012 183    0.008  66    0.006 204    0.010 341
DCP 4     .049       0.929    1.571 350    0.055 342    0.015 337    0.002 117    0.007 299    0.006 189    0.002 274    0.008 231    0.005  13
DCP 5     .074       0.942    1.243 350    0.042 346    0.011 324    0.003 205    0.005 299    0.001 172    0.003 256    0.004 212    0.004 284
DCP 6     .099       0.924    1.064 351    0.039 358    0.007 314    0.001 107    0.002 311    0.001 284    0.002 235    0.005 203    0.003 302
DCP 7     .149       0.660    0.802 352    0.033   0    0.003 345    0.003 257    0.004  98    0.003 191    0.000 337    0.006 197    0.004 346
DCP 8     .200       0.553    0.654 355    0.025   1    0.008   1    0.003   1    0.004 337    0.001 277    0.002  65    0.009 221    0.006  69
DCP 9     .250       0.470    0.567 355    0.027  10    0.006 231    0.003  39    0.002 281    0.001 241    0.002 282    0.005 137    0.006  70
DCP10     .300       0.447    0.475 355    0.024  20    0.002 297    0.005 335    0.003  20    0.005 218    0.004   9    0.002 152    0.003   6
DCP11     .399       0.385    0.374   1    0.015  27    0.004 108    0.003 352    0.005 308    0.002 134    0.001  56    0.004 156    0.004  16
DCP12     .501       0.272    0.292   4    0.012  35    0.011 117    0.001  89    0.004 261    0.002  73    0.005 120    0.004 179    0.002  65
DCP13     .600       0.264    0.223   6    0.017  46    0.009 103    0.002 290    0.004 214    0.005 356    0.005 156    0.004 183    0.011  52
DCP14     .701       0.275    0.152  10    0.011  37    0.007  53    0.004  14    0.004 156    0.007   9    0.005 146    0.006  99    0.006  15
DCP15     .800       0.142    0.091  17    0.011  37    0.006  42    0.002 262    0.003  82    0.003 312    0.004 130    0.005 129    0.003  15
DCP16     .900      -0.048    0.0[illegible]  26    0.005  63    0.008 328    0.007  10    0.003 160    0.005 230    0.007 283    0.005 121    0.007 261
DCP17     .969      -0.034    0.013 181    0.004 343    0.010 175    0.001 321    0.002 294    0.002 247    0.002 244    0.006 144    0.004 328
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.16	0.115	0.302	5.15	0.0	5.01	12009.3	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
102.1 (335.1)	27273. (569.6)	0.48E 07	-0.026	1.005	9.95	-0.00094	0.779	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		5.009	5.147	0	0.237	8	0.036	257	0.003	305	0.013	351	0.006	213	0.027	229	0.005	225	0.004	77
CN		0.594	0.426	356	0.022	17	0.005	40	0.003	249	0.002	338	0.001	207	0.005	348	0.006	317	0.003	224
CM		-0.009	0.015	305	0.002	263	0.001	262	0.000	114	0.000	210	0.000	13	0.001	183	0.001	119	0.001	90
DCP 1	.010	2.563	2.774	347	0.144	16	0.066	339	0.050	227	0.020	149	0.009	137	0.004	345	0.024	341	0.005	212
DCP 2	.020	2.096	2.263	350	0.101	356	0.018	355	0.008	236	0.003	147	0.003	120	0.009	337	0.022	342	0.010	187
DCP 3	.030	2.015	1.913	350	0.085	353	0.009	356	0.004	354	0.006	205	0.002	102	0.007	335	0.013	340	0.007	198
DCP 4	.049	1.797	1.569	350	0.067	346	0.011	337	0.001	233	0.005	282	0.007	237	0.010	329	0.012	344	0.012	159
DCP 5	.074	1.632	1.259	351	0.053	355	0.013	356	0.004	201	0.005	301	0.005	223	0.010	332	0.011	332	0.012	181
DCP 6	.099	1.510	1.062	351	0.045	357	0.010	356	0.001	221	0.003	316	0.005	230	0.007	348	0.011	329	0.009	170
DCP 7	.149	1.098	0.790	353	0.030	1	0.008	322	0.008	191	0.010	294	0.005	222	0.007	346	0.014	322	0.003	138
DCP 8	.200	0.905	0.646	356	0.030	6	0.011	24	0.006	216	0.003	79	0.002	59	0.005	358	0.010	313	0.007	192
DCP 9	.250	0.779	0.557	355	0.030	10	0.006	178	0.004	256	0.003	31	0.005	193	0.000	325	0.004	310	0.003	306
DCP10	.300	0.706	0.460	356	0.023	23	0.006	56	0.001	284	0.006	276	0.004	150	0.004	299	0.005	296	0.002	257
DCP11	.399	0.592	0.367	1	0.019	32	0.011	88	0.002	333	0.009	327	0.002	222	0.008	346	0.001	263	0.005	262
DCP12	.501	0.429	0.280	5	0.020	29	0.007	102	0.005	263	0.002	174	0.001	306	0.005	338	0.005	327	0.003	345
DCP13	.600	0.380	0.210	7	0.017	23	0.010	64	0.006	264	0.003	105	0.006	4	0.002	342	0.005	291	0.002	290
DCP14	.701	0.353	0.143	12	0.020	62	0.008	11	0.002	290	0.009	60	0.002	306	0.009	344	0.005	312	0.003	225
DCP15	.800	0.188	0.082	20	0.011	58	0.007	29	0.001	106	0.006	45	0.004	243	0.005	25	0.007	297	0.003	253
DCP16	.900	-0.044	0.031	35	0.004	93	0.004	72	0.005	296	0.009	269	0.008	161	0.007	354	0.004	357	0.004	239
DCP17	.969	-0.043	0.010	219	0.003	31	0.008	185	0.002	166	0.005	173	0.002	132	0.009	26	0.007	299	0.001	203

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.13	0.116	0.300	5.14	0.0	7.48	12009.4	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
101.6 (333.2)	27019. (564.3)	0.48E 07	-0.023	1.213	12.61	-0.00112	0.921	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.477	5.140	0	0.247	7	0.051	264	0.003	308	0.012	55	0.013	354	0.020	201	0.006	170	0.006	133
CN		0.816	0.403	358	0.029	21	0.002	336	0.004	101	0.002	22	0.001	51	0.001	335	0.006	325	0.003	200
CM		-0.003	0.018	307	0.002	253	0.001	246	0.001	288	0.001	287	0.001	224	0.000	70	0.001	109	0.002	122
DCP 1	.010	4.060	2.722	348	0.154	331	0.110	167	0.132	64	0.081	324	0.015	261	0.019	302	0.016	5	0.015	211
DCP 2	.020	3.261	2.136	351	0.125	22	0.054	342	0.018	231	0.007	284	0.012	205	0.007	329	0.017	22	0.008	231
DCP 3	.030	3.024	1.861	351	0.094	359	0.015	338	0.009	225	0.005	309	0.009	196	0.004	7	0.006	11	0.010	215
DCP 4	.049	2.634	1.531	351	0.090	11	0.024	329	0.007	232	0.003	41	0.002	306	0.036	37	0.012	18	0.008	166
DCP 5	.074	2.295	1.206	352	0.071	13	0.016	330	0.005	222	0.002	21	0.002	350	0.004	13	0.012	11	0.007	186
DCP 6	.099	2.062	1.016	353	0.060	16	0.014	332	0.006	226	0.004	277	0.004	261	0.005	346	0.014	19	0.004	167
DCP 7	.149	1.512	0.771	354	0.047	18	0.003	320	0.009	141	0.007	349	0.005	173	0.008	349	0.011	359	0.008	190
DCP 8	.200	1.243	0.625	357	0.042	14	0.011	319	0.005	151	0.006	83	0.005	217	0.005	62	0.010	13	0.006	195
DCP 9	.250	1.065	0.537	357	0.030	6	0.007	238	0.006	113	0.004	36	0.001	67	0.003	27	0.007	350	0.001	165
DCP10	.300	0.944	0.434	358	0.033	21	0.000	157	0.006	55	0.004	169	0.001	14	0.003	49	0.005	257	0.005	285
DCP11	.399	0.782	0.347	5	0.031	30	0.002	179	0.004	43	0.002	343	0.004	79	0.001	193	0.009	307	0.005	148
DCP12	.501	0.573	0.261	8	0.023	37	0.003	205	0.007	114	0.003	9	0.004	45	0.004	226	0.008	276	0.005	198
DCP13	.600	0.476	0.194	12	0.021	47	0.005	99	0.007	110	0.005	58	0.004	65	0.002	251	0.010	310	0.003	208
DCP14	.701	0.422	0.123	23	0.024	46	0.002	326	0.005	67	0.004	104	0.003	356	0.003	65	0.003	340	0.001	158
DCP15	.800	0.227	0.069	33	0.011	45	0.005	35	0.001	224	0.003	110	0.002	322	0.004	7	0.003	266	0.004	289
DCP16	.900	-0.026	0.029	42	0.002	0	0.007	10	0.002	287	0.003	173	0.001	32	0.008	217	0.006	264	0.004	127
DCP17	.969	-0.049	0.012	104	0.004	298	0.005	156	0.008	124	0.004	317	0.004	142	0.004	305	0.010	355	0.006	341

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                               FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                     TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                       0.0       23.26       0.117       0.300       5.12        0.0           9.99      12009.5      20

                     V          Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                      101.2      26875.      0.48E 07   -0.092       1.404       15.10      -0.00046     0.390       0.0
                     (331.9)    (561.3)
                                                                    HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                 9.993     5.121   0   0.266  14   0.062 265   0.012 195   0.032  78   0.037 347   0.031 164   0.013 154   0.007 306
CN                    0.943     0.351  22   0.100 339   0.037 174   0.022  34   0.013 310   0.013 230   0.016 138   0.011  72   0.015 313
CM                   -0.011     0.019 207   0.026  52   0.021 292   0.013 174   0.005  88   0.004  11   0.003 295   0.002 235   0.004 117

DCP 1     .010        4.406     1.175  22   1.146  38   0.609 314   0.393 244   0.317 179   0.205 108   0.112  30   0.060 261   0.076 184
DCP 2     .020        3.521     0.903  29   1.017  45   0.602 320   0.364 237   0.243 166   0.167 101   0.126  49   0.062 349   0.069 302
DCP 3     .030        3.143     0.757  41   0.987  38   0.554 305   0.255 211   0.088 161   0.118 139   0.165  61   0.117 331   0.089 257
DCP 4     .049        3.074     1.078  12   0.380  16   0.135 279   0.073 172   0.048  76   0.033 352   0.017 264   0.015 186   0.006 118
DCP 5     .074        2.612     0.818  15   0.337  16   0.127 273   0.071 161   0.041  55   0.034 324   0.021 216   0.022 145   0.008  18
DCP 6     .099        2.296     0.680  20   0.316  15   0.125 267   0.077 152   0.045  47   0.033 315   0.023 208   0.015 133   0.006 337
DCP 7     .149        1.710     0.555  24   0.264   2   0.118 241   0.061 130   0.036  22   0.021 299   0.008 216   0.014 162   0.002 296
DCP 8     .200        1.450     0.562  23   0.224 338   0.143 210   0.091  95   0.053   0   0.032 285   0.026 193   0.025 134   0.011 351
DCP 9     .250        1.274     0.564  19   0.216 313   0.159 179   0.105  74   0.063 351   0.053 281   0.053 191   0.043 107   0.035  13
DCP10     .300        1.138     0.502  17   0.193 300   0.150 170   0.096  69   0.064 355   0.063 275   0.057 178   0.036  85   0.024   4
DCP11     .399        0.943     0.415  20   0.146 293   0.124 157   0.082  46   0.049 328   0.048 255   0.043 159   0.028  72   0.021 336
DCP12     .501        0.687     0.302  23   0.092 282   0.101 131   0.076  16   0.050 285   0.035 205   0.034 126   0.023  43   0.025 323
DCP13     .600        0.546     0.228  29   0.069 273   0.086 115   0.063 352   0.038 260   0.033 173   0.022  90   0.016  38   0.021 317
DCP14     .701        0.457     0.152  40   0.050 260   0.072 103   0.063 329   0.021 232   0.015 159   0.015  88   0.009   4   0.022 295
DCP15     .800        0.268     0.118  29   0.061 233   0.063  93   0.042 320   0.013 202   0.003 174   0.009 110   0.006  44   0.026 260
DCP16     .900        0.016     0.085   1   0.044 212   0.022  81   0.017 313   0.014 220   0.016 122   0.009   1   0.005 207   0.009 229
DCP17     .969       -0.032     0.035 350   0.024 222   0.018  62   0.012 297   0.007 164   0.004 133   0.007  29   0.004 135   0.005 230

                               FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                     TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                       0.0       23.22       0.117       0.299       5.08        0.0          12.48      12009.6      20

                     V          Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                      101.1      26732.      0.48E 07   -0.183       1.691       16.86      -0.00108     0.882       0.0
                     (330.8)    (558.3)
                                                                    HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                12.478     5.084   0   0.239  14   0.016 315   0.052 351   0.039 291   0.071 165   0.025 230   0.016  35   0.013 306
CN                    1.045     0.299  52   0.160  16   0.082 302   0.063 219   0.042 143   0.032  70   0.020 359   0.008  46   0.024 293
CM                   -0.025     0.054 199   0.038  94   0.021  46   0.020 346   0.013 280   0.011 210   0.006 139   0.001  41   0.005  80

DCP 1     .010        4.584     0.774 143   1.352  81   0.726  40   0.427 357   0.235 333   0.156 341   0.197 307   0.107 253   0.060 216
DCP 2     .020        3.801     0.603 134   1.167  79   0.491  32   0.264 359   0.162 326   0.089 328   0.148 305   0.114 257   0.097 241
DCP 3     .030        3.302     0.745 135   1.062  69   0.246  25   0.236  39   0.205 340   0.092 319   0.136 308   0.120 254   0.075 233
DCP 4     .049        3.323     0.454  61   0.620  61   0.260   6   0.148 313   0.105 261   0.072 203   0.051 153   0.044 106   0.011  21
DCP 5     .074        2.792     0.414  75   0.555  54   0.226 347   0.116 281   0.066 222   0.048 166   0.029 112   0.031  70   0.014 324
DCP 6     .099        2.448     0.427  80   0.511  48   0.213 335   0.111 267   0.055 204   0.038 160   0.028 121   0.031  85   0.012 347
DCP 7     .149        1.880     0.440  64   0.381  29   0.153 313   0.089 247   0.056 186   0.027 122   0.008  64   0.019  89   0.007 335
DCP 8     .200        1.579     0.462  59   0.339  21   0.165 314   0.137 255   0.100 195   0.060 135   0.036  85   0.027  60   0.020 330
DCP 9     .250        1.385     0.488  53   0.305   7   0.175 305   0.159 240   0.127 169   0.072 111   0.044  71   0.044  49   0.032 317
DCP10     .300        1.229     0.457  50   0.277   1   0.174 300   0.162 234   0.116 166   0.079 115   0.052  61   0.047  42   0.046 336
DCP11     .399        1.041     0.424  48   0.223 351   0.152 294   0.144 229   0.102 162   0.081 107   0.044  57   0.042  58   0.062 344
DCP12     .501        0.797     0.365  41   0.159 331   0.109 273   0.118 202   0.090 129   0.073  73   0.043  17   0.032  18   0.061 305
DCP13     .600        0.637     0.303  40   0.126 310   0.081 242   0.094 179   0.076 105   0.057  42   0.042 349   0.016 351   0.052 277
DCP14     .701        0.542     0.244  38   0.118 288   0.069 222   0.085 155   0.062  81   0.053  16   0.043 316   0.021 241   0.031 243
DCP15     .800        0.345     0.205  21   0.104 270   0.065 219   0.075 142   0.039  66   0.047   9   0.044 294   0.025 219   0.025 199
DCP16     .900        0.071     0.148   6   0.064 265   0.047 216   0.041 133   0.028  66   0.040 354   0.026 265   0.020 191   0.018 207
DCP17     .969       -0.003     0.078 357   0.028 282   0.026 243   0.018 147   0.016  94   0.022 353   0.013 270   0.012 191   0.011 180
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                        FORCED  PITCHING  OSCILLATION                 AIRFOIL     NLR 1

           TUNED HZ     DRIVE HZ    K            MACH NO     DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0          23.24       0.118        0.298       5.05         0.0          15.04        12009.7       20

           V            Q           RN           CN(MIN)     CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
           100.6         26660       0.48E 07    -0.219       1.828        17.82       -0.00164      1.331         0.0
           (330.0)      (556.8)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              15.036   5.048   0   0.224  16   0.022 192   0.027  96   0.082  60   0.106 328   0.040 186   0.039 159   0.014 189
CN                  1.093   0.324  81   0.149  52   0.078   5   0.061 343   0.058 285   0.046 247   0.036 204   0.027 168   0.013 158
CM                 -0.043   0.075 198   0.024 143   0.027 122   0.017 107   0.018  63   0.013  27   0.010 354   0.011 317   0.003 278

DCP 1     .010      4.240   1.989 159   0.989 110   0.543 127   0.403 128   0.213 114   0.172 154   0.166 134   0.076 123   0.090 110
DCP 2     .020      3.642   1.588 155   0.715 102   0.406 125   0.224 114   0.142 108   0.104 151   0.139 143   0.107 138   0.140 134
DCP 3     .030      3.187   1.483 149   0.416  98   0.479 138   0.145 113   0.213 132   0.092 116   0.130 133   0.067 109   0.094 134
DCP 4     .049      3.350   0.678 136   0.564 100   0.293  82   0.192  50   0.123  17   0.088 347   0.051 297   0.019 316   0.017  34
DCP 5     .074      2.808   0.685 128   0.451  84   0.203  66   0.131  33   0.085 347   0.056 327   0.045 279   0.020 299   0.014 333
DCP 6     .099      2.452   0.688 121   0.387  71   0.162  56   0.118  20   0.084 327   0.040 300   0.037 263   0.015 289   0.003 349
DCP 7     .149      1.939   0.587  96   0.263  55   0.173  42   0.103   3   0.095 331   0.063 288   0.039 243   0.020 300   0.014 227
DCP 8     .200      1.617   0.549  92   0.277  60   0.197  36   0.123   7   0.122 333   0.083 296   0.047 264   0.035 294   0.012 255
DCP 9     .250      1.448   0.530  82   0.291  49   0.201  14   0.133 357   0.143 316   0.095 284   0.061 248   0.037 242   0.032 226
DCP10     .300      1.287   0.478  76   0.263  46   0.181   6   0.160 353   0.126 308   0.089 279   0.049 251   0.042 239   0.033 230
DCP11     .399      1.103   0.429  68   0.210  40   0.149 354   0.116 348   0.106 300   0.090 279   0.050 241   0.055 222   0.035 228
DCP12     .501      0.871   0.373  57   0.145  24   0.123 330   0.082 327   0.088 276   0.072 247   0.053 217   0.061 193   0.034 181
DCP13     .600      0.715   0.344  49   0.106   4   0.119 318   0.078 300   0.100 260   0.081 225   0.066 201   0.066 167   0.040 144
DCP14     .701      0.608   0.301  40   0.070 329   0.105 300   0.070 283   0.094 239   0.074 200   0.061 171   0.060 132   0.030 104
DCP15     .800      0.417   0.266  23   0.060 318   0.085 293   0.064 281   0.074 225   0.060 187   0.054 154   0.059 106   0.024  75
DCP16     .900      0.136   0.191  11   0.051 333   0.046 285   0.043 264   0.035 198   0.038 168   0.027 130   0.048 108   0.021  16
DCP17     .969      0.023   0.087  12   0.032 349   0.030 288   0.017 260   0.021 215   0.017 164   0.023 139   0.024 121   0.018  45

                        FORCED  PITCHING  OSCILLATION                 AIRFOIL     NLR 1

           TUNED HZ     DRIVE HZ    K            MACH NO     DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0          23.27       0.116        0.299       5.04         0.0          17.51        12009.8       20

           V            Q           RN           CN(MIN)     CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
           100.6         26703.      0.48E 07    -0.214       1.845        17.99       -0.00265      2.154         0.0
           (330.1)      (557.7)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              17.512   5.041   0   0.199   4   0.067 238   0.030 189   0.031 142   0.069 112   0.019 236   0.028  34   0.009  56
CN                  1.090   0.352  96   0.133  83   0.076  91   0.055  68   0.047  55   0.044  40   0.022  32   0.029  33   0.015  44
CM                 -0.057   0.075 206   0.037 236   0.021 195   0.016 199   0.014 187   0.013 182   0.004 169   0.009 183   0.004 169

DCP 1     .010      3.647   2.455 164   0.685 178   0.684 200   0.276 235   0.252 252   0.136 310   0.143 295   0.085 313   0.115 320
DCP 2     .020      3.176   1.920 160   0.478 178   0.424 188   0.190 222   0.144 262   0.129 309   0.140 323   0.131 341   0.113   3
DCP 3     .030      2.780   1.665 153   0.564 206   0.295 180   0.295 220   0.144 268   0.092 260   0.122 302   0.077 336   0.065 344
DCP 4     .049      3.311   0.865 156   0.398 161   0.229 152   0.163 161   0.108 150   0.078 165   0.030 124   0.051 194   0.042 156
DCP 5     .074      2.756   0.826 141   0.286 121   0.162 138   0.099 144   0.085 115   0.036 119   0.025  87   0.030 188   0.029 134
DCP 6     .099      2.416   0.797 129   0.219 115   0.181 124   0.077 109   0.086 100   0.031  83   0.035  84   0.019 155   0.026 115
DCP 7     .149      1.922   0.613 135   0.198 117   0.143 135   0.091 112   0.074  98   0.057  91   0.035  62   0.022 128   0.012 116
DCP 8     .200      1.578   0.598 108   0.269 109   0.177 109   0.147  98   0.116  98   0.085  89   0.038  89   0.051 106   0.023 122
DCP 9     .250      1.435   0.571  99   0.266  97   0.181 100   0.157  80   0.110  93   0.088  73   0.051  87   0.050  71   0.035 105
DCP10     .300      1.291   0.518  91   0.245  88   0.177  97   0.146  80   0.117  65   0.087  77   0.054  77   0.051  82   0.032 101
DCP11     .399      1.119   0.458  82   0.201  76   0.145  85   0.116  74   0.099  73   0.087  72   0.068  69   0.074  73   0.032  81
DCP12     .501      0.901   0.393  69   0.177  56   0.106  62   0.092  44   0.083  46   0.078  42   0.069  39   0.070  33   0.039  59
DCP13     .600      0.746   0.361  58   0.159  45   0.094  41   0.082  22   0.076  24   0.078  16   0.036   5   0.065  11   0.031  32
DCP14     .701      0.636   0.309  46   0.139  36   0.079  11   0.071   7   0.069 359   0.071 355   0.033 335   0.044 345   0.028 356
DCP15     .800      0.463   0.254  31   0.129  29   0.069 356   0.055   8   0.063 341   0.056 337   0.028 298   0.036 322   0.027 317
DCP16     .900      0.184   0.159  25   0.098  10   0.048 355   0.025 354   0.038 330   0.036 320   0.012 303   0.023 336   0.025 296
DCP17     .969      0.041   0.064  31   0.046  25   0.011  14   0.011   3   0.016 334   0.011 334   0.008 299   0.009 346   0.012 321
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         43.18      0.118       0.298       5.07        0.0         19.95      12009.9      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
            100.4        26607.      3.48E 07   -0.201       1.591       18.52      -0.00417     3.389       0.0
           (329.3)      (555.7)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             19.946    5.065   0   0.215   6   0.059 245   0.012 251   0.013   6   0.031 298   0.030 193   0.002 105   0.006  21
CN                 1.058    0.315 100   0.048 133   0.060 150   0.034 167   0.032 162   0.028 177   0.019 184   0.003 146   0.002 171
CM                -0.065    0.065 234   0.022 242   0.018 274   0.011 294   0.010 307   0.008 335   0.003 349   0.001 241   0.002 349

DCP 1     .013     2.614    1.651 161   0.585 228   0.224 248   0.229 297   0.113  11   0.037  54   0.055  91   0.043 111   0.023 148
DCP 2     .030     2.480    1.197 161   0.464 232   0.193 258   0.159 307   0.067   2   0.0[illegible]  53   0.021 106   0.045 121   0.018 228
DCP 3     .050     2.276    0.936 155   0.481 227   0.205 283   0.096 325   0.029  19   0.032  59   0.071 154   0.033 132   0.018 213
DCP 4     .069     2.913    0.843 164   0.144 221   0.251 228   0.056 263   0.006 257   0.013 291   0.015 136   0.038  58   0.037  32
DCP 5     .074     2.433    0.616 144   0.117 253   0.187 221   0.026 196   0.041 226   0.009 131   0.017 153   0.029  56   0.030   4
DCP 6     .099     2.119    0.514 126   0.090 229   0.097 213   0.041 202   0.043 [illegible]   0.012 155   0.026 154   0.017  69   0.012  42
DCP 7     .149     1.734    0.412  99   0.101 150   0.090 190   0.058 187   0.031 193   0.013 165   0.015 211   0.009 148   0.012  29
DCP 8     .200     1.471    0.408 109   0.132 157   0.118 176   0.[illegible] 212   0.058 206   0.040 239   0.027 230   0.010 256   0.008 340
DCP 9     .250     1.367    0.428 104   0.125 148   0.133 [illegible]   0.085 192   0.067 188   0.056 218   0.041 218   0.027 265   0.005 343
DCP10     .300     1.255    0.399  98   0.122 141   0.119 149   0.081 190   0.059 192   0.049 212   0.032 210   0.023 250   0.009 298
DCP11     .399     1.167    0.391  94   0.101 130   0.117 139   0.077 187   0.050 187   0.057 201   0.034 214   0.021 250   0.008 239
DCP12     .531     0.959    0.359  84   0.087 132   0.098 125   0.063 161   0.051 162   0.050 171   0.037 160   0.017 214   0.008 247
DCP13     .600     0.812    0.334  74   0.086  74   0.075 106   0.054 127   0.058 138   0.045 162   0.026 153   0.024 140   0.017 189
DCP14     .701     0.712    0.310  65   0.094  60   0.071  98   0.048 109   0.046 110   0.034 147   0.011 130   0.022  90   0.009 144
DCP15     .800     0.554    0.251  61   0.079  52   0.056  90   0.045  98   0.041 110   0.036 142   0.014 169   0.015  28   0.011 117
DCP16     .900     0.247    0.166  62   0.046  39   0.029  62   0.010  72   0.027  97   0.023 126   0.011 129   0.016   6   0.006 101
DCP17     .969     0.072    0.083  71   0.013  63   0.013  95   0.012  80   0.011 117   0.007 131   0.004 122   0.003 226   0.012 204

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         45.80      0.225       0.305       5.53        0.0        -0.01       12011.1      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
            103.8        27952.      3.49E 07   -0.049       0.494        5.56      -0.00091     0.782       0.0
           (340.4)      (583.8)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             -0.009    5.529   0   0.305   5   0.135 298   0.044 238   0.043 107   0.018  60   0.023 197   0.012 239   0.009  89
CN                 0.118    0.393   3   0.018  41   0.007  12   0.012 235   0.003 245   0.002 248   0.002   7   0.001 137   0.001 189
CM                -0.018    0.327 241   0.004 247   0.001 258   0.005 139   0.000 111   0.001 137   0.001 162   0.001 127   0.000  61

DCP 1     .013    -0.655    2.914 344   0.209  22   0.023  51   0.061 147   0.006   9   0.012 142   0.006 110   0.007 127   0.011  70
DCP 2     .020    -0.345    2.110 350   0.088 358   0.027 342   0.059 165   0.005 338   0.049 150   0.008 301   0.008 173   0.034 199
DCP 3     .030    -0.028    1.754 349   0.382 342   0.029 334   0.039 164   0.009 293   0.009 128   0.005 298   0.006 132   0.006 158
DCP 4     .049     0.082    1.427 351   0.047 345   0.016 329   0.039 159   0.010 297   0.005 112   0.004 303   0.004  77   0.006 110
DCP 5     .074     0.253    1.130 351   0.344 355   0.013 352   0.034 153   0.035 260   0.006 141   0.005  34   0.006 136   0.004  62
DCP 6     .099     0.349    0.967 353   0.043   4   0.017 343   0.035 162   0.010 285   0.003 127   0.005 342   0.001 119   0.007 152
DCP 7     .149     0.227    0.730 355   0.034  16   0.017 342   0.028 145   0.007 251   0.007 135   0.005 125   0.009 110   0.000 208
DCP 8     .200     0.195    0.599   2   0.028  31   0.012  16   0.010 159   0.008 327   0.004 122   0.005  63   0.008 109   0.007 149
DCP 9     .250     0.165    0.516   1   0.027  14   0.005  33   0.018 242   0.003 150   0.005  22   0.001 254   0.009 118   0.002 110
DCP10     .300     0.188    0.435   3   0.019  38   0.006   7   0.017 247   0.008 340   0.003  20   0.001 213   0.003 134   0.003 345
DCP11     .399     0.181    0.351  14   0.021  60   0.010  23   0.021 268   0.004 206   0.006 354   0.006  51   0.003 200   0.004 103
DCP12     .501     0.114    0.271  22   0.020  71   0.006  63   0.021 278   0.002 208   0.005 301   0.004  71   0.008 266   0.002 310
DCP13     .601     0.149    0.215  28   0.014  89   0.012  19   0.023 279   0.032  29   0.012 298   0.004  27   0.003 265   0.004 265
DCP14     .701     0.190    0.153  37   0.019  91   0.007  26   0.012 274   0.034 275   0.004 247   0.006 319   0.001  72   0.002 126
DCP15     .800     0.092    0.101  46   0.015 133   0.005  77   0.015 281   0.005 246   0.006 272   0.007 332   0.005 354   0.006 210
DCP16     .900    -0.303    0.066  73   0.013  98   0.032 236   0.014 256   0.032 316   0.008 149   0.004 261   0.001 268   0.003 221
DCP17     .969     0.042    0.020 163   0.004 171   0.007 167   0.017 311   0.005 129   0.007 334   0.004 123   0.001 316   0.007   6
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                           FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

               TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H         ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0        45.79       0.227       0.303       5.52        0.0           2.43       12011.2      20

               V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP     TDR         EXT DAMP
               102.6        27435.      0.49E 07   -0.046       0.742       8.02       -0.00090       0.768       0.0
              (336.5)      (573.0)
                                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.433    5.524   0   0.314   4   0.109 297   0.017 199   0.036  90   0.031  66   0.029 211   0.014 208   0.009 126
CN                  0.349    0.392   3   0.022  27   0.006  12   0.013 178   0.002 346   0.003 118   0.003 270   0.002 147   0.001 212
CM                 -0.012    0.027 292   0.003 272   0.002 307   0.005   7   0.002 185   0.001 283   0.001  90   0.001 311   0.001  25

DCP 1    .010       0.981    2.707 344   0.141   0   0.038 335   0.012  69   0.008 238   0.005 124   0.001 274   0.003 176   0.009  29
DCP 2    .020       0.841    2.110 349   0.106   4   0.063 332   0.009  77   0.012 160   0.007  97   0.005 214   0.002 242   0.009   0
DCP 3    .030       0.966    1.775 349   0.082 356   0.049 330   0.007  93   0.001 114   0.006 205   0.008 131   0.002  84   0.008 281
DCP 4    .049       0.910    1.463 350   0.059 352   0.023 350   0.010  68   0.007 206   0.003   2   0.012 253   0.006 209   0.005  16
DCP 5    .074       0.918    1.153 351   0.049 357   0.022 339   0.006  82   0.010 216   0.004 309   0.009 225   0.004 158   0.004  30
DCP 6    .099       0.915    0.984 353   0.048  10   0.019 339   0.011  58   0.004 223   0.004 275   0.004 175   0.007 203   0.003 107
DCP 7    .149       0.651    0.735 355   0.030   5   0.012  11   0.003 198   0.005  48   0.008  84   0.007  90   0.005 138   0.004  25
DCP 8    .200       0.543    0.605   1   0.024  14   0.012 351   0.002  91   0.001 248   0.000 203   0.010 326   0.007 289   0.001 326
DCP 9    .250       0.459    0.521   1   0.032  14   0.007  21   0.018 161   0.004 161   0.003 193   0.004 264   0.001 164   0.005 226
DCP10    .300       0.443    0.437   2   0.028  31   0.012 356   0.020 172   0.001 212   0.004 120   0.005 286   0.002 163   0.004 108
DCP11    .399       0.387    0.349  14   0.028  55   0.008  39   0.021 190   0.003 183   0.009 123   0.004 270   0.008  85   0.005 164
DCP12    .501       0.262    0.270  22   0.021  53   0.009  16   0.013 186   0.005 295   0.005 142   0.001 278   0.003 155   0.004 299
DCP13    .600       0.254    0.206  29   0.013  21   0.006  40   0.011 173   0.009 337   0.006 168   0.011 282   0.004 205   0.008 272
DCP14    .701       0.267    0.154  37   0.017  72   0.011 116   0.019 179   0.005 353   0.004 304   0.003 254   0.007 110   0.004 126
DCP15    .800       0.140    0.100  49   0.010  62   0.003  68   0.015 165   0.008  10   0.006  69   0.006 281   0.003 345   0.004 154
DCP16    .900      -0.070    0.04[illegible]  62   0.014  98   0.009 151   0.020 198   0.005  76   0.002 199   0.001 296   0.008 200   0.006 204
DCP17    .969      -0.045    0.022 [illegible]50   0.008 326   0.004 235   0.023 197   0.011 359   0.006  58   0.009 134   0.006  75   0.002 271

                           FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

               TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H         ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0        45.75       0.230       0.300       5.54        0.0           5.01       12011.3      20

               V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP     TDR         EXT DAMP
               101.5        26947.      0.48E 07   -0.043       0.972       10.59      -0.00094       0.789       0.0
              (332.9)      (562.8)
                                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               5.014    5.535   0   0.313   5   0.096 297   0.040  27   0.032  78   0.019  79   0.026 193   0.006 201   0.007  93
CN                  0.596    0.388   4   0.024  31   0.009 358   0.011  80   0.003 269   0.002  22   0.002  90   0.001 100   0.003 214
CM                 -0.009    0.028 293   0.003 264   0.001 235   0.005 248   0.001  91   0.001 152   0.001 265   0.000 209   0.001  16

DCP 1    .010       2.546    2.603 344   0.137  11   0.075 316   0.049 204   0.007  86   0.007 115   0.007  30   0.007 265   0.004 229
DCP 2    .020       2.110    2.110 350   0.095   3   0.022 325   0.022 201   0.008  13   0.010 172   0.004   6   0.010 208   0.003 264
DCP 3    .030       2.022    1.777 349   0.079   3   0.019 322   0.009 158   0.008 319   0.005 163   0.003 212   0.007 188   0.002 249
DCP 4    .049       1.799    1.471 350   0.060 359   0.023 329   0.014 193   0.008 310   0.009 190   0.003 258   0.009 180   0.006 226
DCP 5    .074       1.629    1.161 351   0.054   4   0.022 332   0.014 205   0.006 328   0.005 172   0.001 238   0.005 182   0.005 214
DCP 6    .099       1.514    0.976 353   0.050   8   0.016 334   0.015 199   0.010 351   0.003 132   0.003 286   0.008 129   0.003 230
DCP 7    .149       1.110    0.719 356   0.035  14   0.020 336   0.011 195   0.008 247   0.007 181   0.001 270   0.007  88   0.007 289
DCP 8    .200       0.912    0.599   2   0.034  27   0.007 346   0.017 181   0.006 348   0.002 213   0.006 246   0.004 306   0.005 228
DCP 9    .250       0.768    0.516   2   0.037  17   0.016  21   0.019  31   0.004 120   0.001 332   0.003 185   0.002  27   0.004 312
DCP10    .300       0.711    0.432   5   0.028  33   0.013 359   0.016  41   0.007 185   0.015  77   0.002  50   0.002 274   0.005 156
DCP11    .399       0.601    0.349  17   0.027  51   0.009  10   0.021  62   0.008 207   0.009  56   0.005 108   0.004 144   0.003 278
DCP12    .501       0.428    0.274  23   0.016  55   0.011  37   0.016  73   0.007 260   0.007  22   0.006  91   0.003 271   0.003 264
DCP13    .600       0.377    0.215  29   0.024  52   0.004 345   0.015  75   0.002  67   0.006  52   0.002  90   0.005  47   0.004 205
DCP14    .701       0.353    0.144  41   0.020  71   0.007   8   0.020  76   0.004 330   0.015 268   0.004  73   0.002  48   0.009 164
DCP15    .800       0.192    0.101  53   0.017  59   0.007  43   0.018  65   0.009 246   0.010 296   0.004  67   0.003  60   0.007 150
DCP16    .900      -0.040    0.044  70   0.009  55   0.004  50   0.013  33   0.009  42   0.005  34   0.008  75   0.001   2   0.010 276
DCP17    .969      -0.051    0.026 154   0.005 283   0.001  37   0.028 113   0.017 270   0.003  90   0.004 141   0.001 284   0.008 183
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       45.79      0.231       0.299      5.53       0.0         7.50     12011.4      20

               V          Q          RN          CN(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
              101.0       26765.      0.48E 07   -0.039      1.193      13.05     -0.00103    0.862       0.0
             (331.3)     (559.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              7.503    5.533   0  0.315   6  0.093 293  0.038  37  0.029  86  0.014  81  0.024 204  0.010 253  0.006 124
CN                 0.820    0.374   6  0.028  26  0.005  52  0.017  62  0.005 278  0.003 327  0.001 247  0.002 222  0.002 175
CM                -0.004    0.031 293  0.002 262  0.002 295  0.005 227  0.001 107  0.002 139  0.001 234  0.000 331  0.001 330

DCP 1    .010      4.010    2.482 345  0.151 353  0.042 163  0.115  52  0.058 302  0.006 265  0.026 239  0.008 158  0.011 235
DCP 2    .020      3.287    2.025 350  0.115  20  0.057 337  0.015 156  0.016 257  0.002  70  0.013 261  0.006 127  0.006 327
DCP 3    .030      3.036    1.758 350  0.088 359  0.024 345  0.004 100  0.010 258  0.013 166  0.009 221  0.004 155  0.003 234
DCP 4    .049      2.641    1.444 351  0.089  10  0.033 339  0.014 128  0.006 260  0.015 157  0.010 238  0.002 294  0.00[illegible]
DCP 5    .074      2.295    1.136 352  0.066  12  0.022 332  0.014 125  0.006 246  0.008 149  0.003 284  0.013 270  [illegible]
DCP 6    .099      2.067    0.948 354  0.055   9  0.021 343  0.017 121  0.009 220  0.006 127  0.007 241  0.009 274  0.00[illegible]  33
DCP 7    .149      1.524    0.715 357  0.049  19  0.011 332  0.018 126  0.009 319  0.006  29  0.009 194  0.008 250  0.004 288
DCP 8    .200      1.248    0.585   4  0.036  20  0.015  26  0.004 120  0.004 264  0.008 244  0.011 288  0.006 174  0.006 206
DCP 9    .250      1.061    0.505   4  0.028  31  0.004 340  0.017  34  0.006 164  0.001  55  0.006 216  0.006 114  0.016 231
DCP10    .300      0.953    0.414   8  0.035  28  0.003  18  0.017  54  0.004 295  0.002  98  0.006 203  0.004 268  0.004 143
DCP11    .399      0.792    0.335  20  0.037  47  0.012  87  0.020  70  0.006 265  0.008 339  0.004 276  0.004 229  0.005  94
DCP12    .501      0.573    0.265  28  0.022  40  0.009  66  0.017  48  0.007 257  0.006 336  0.004  61  0.009 336  0.004 219
DCP13    .600      0.482    0.206  39  0.016  41  0.008 127  0.023  49  0.008 310  0.011  11  0.007 103  0.006 148  0.004 148
DCP14    .701      0.426    0.145  50  0.020  44  0.009  96  0.023  51  0.009 274  0.008 323  0.007  24  0.003  32  0.004 106
DCP15    .800      0.230    0.104  61  0.011  54  0.012  87  0.023  56  0.003 317  0.009 279  0.002 258  0.002 244  0.002  27
DCP16    .900     -0.029    0.053  70  0.006  73  0.010 147  0.011  47  0.005 221  0.006 277  0.009  20  0.008 164  0.008 173
DCP17    .969     -0.057    0.016 122  0.005 289  0.003 304  0.016  48  0.007 348  0.004 104  0.009 156  0.003 146  0.002 288

                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       45.76      0.232       0.298      5.51       0.0        10.00     12011.5      20

               V          Q          RN          CN(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
              100.6       26617.      0.48E 07   -0.067      1.410      15.18     -0.00075    0.610       0.0
             (330.1)     (555.9)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             10.003    5.505   0  0.360   4  0.105 269  0.036 256  0.030  69  0.019  60  0.022 192  0.005 292  0.004 152
CN                 0.947    0.446  20  0.030 228  0.040  34  0.036 257  0.024 165  0.022  46  0.014 277  0.008 156  0.004 143
CM                -0.006    0.021 243  0.027 351  0.016 202  0.012  55  0.004 322  0.004 198  0.005  60  0.003 306  0.002 155

DCP 1    .010      4.305    1.706  16  0.975  11  0.561 270  0.296 101  0.210 105  0.062 357  0.075 192  0.095 111  0.094  50
DCP 2    .020      4.549    1.399  27  0.897  17  0.557 275  0.310 172  0.183  90  0.065  37  0.075  16  0.095 295  0.091 197
DCP 3    .030      3.116    1.247  36  0.862   5  0.432 296  0.133 155  0.114 143  0.162  55  0.113 327  0.063 264  0.067 213
DCP 4    .049      3.117    1.377   6  0.161 351  0.034 261  0.033  95  0.013 326  0.008 290  0.011 119  0.003 103  0.009 240
DCP 5    .074      2.653    1.081   8  0.134 349  0.023 233  0.025  25  0.012 287  0.034 275  0.011 138  0.006  25  0.034 274
DCP 6    .099      2.350    0.942  11  0.128 338  0.023 202  0.036  27  0.008 210  0.034 131  0.010 126  0.010 326  0.010 252
DCP 7    .149      1.746    0.757  16  0.122 312  0.058 151  0.052  10  0.021 244  0.003  67  0.004 206  0.011  15  0.005 228
DCP 8    .200      1.477    0.726  17  0.138 269  0.104 114  0.075 355  0.033 238  0.016 124  0.006  75  0.007 319  0.006 109
DCP 9    .250      1.313    0.715  10  0.195 229  0.159  86  0.087 312  0.044 213  0.023 136  0.031  15  0.026 253  0.004 145
DCP10    .300      1.174    0.624   9  0.192 220  0.146  78  0.085 299  0.050 201  0.043  63  0.030 319  0.023 167  0.014   7
DCP11    .399      0.960    0.496  18  0.145 212  0.132  71  0.084 295  0.060 195  0.042  72  0.027 312  0.029 196  0.007 111
DCP12    .501      0.679    0.361  25  0.114 179  0.115  34  0.094 259  0.066 159  0.062  30  0.040 283  0.029 159  0.015  29
DCP13    .600      0.528    0.292  37  0.087 172  0.102  17  0.080 235  0.030 124  0.031  36  0.033 268  0.026 158  0.017  17
DCP14    .701      0.437    0.227  53  0.068 161  0.072 359  0.059 211  0.017 124  0.022   1  0.029 248  0.016 144  0.010   6
DCP15    .800      0.250    0.138  51  0.069 149  0.049 330  0.035 196  0.013 123  0.015  31  0.026 211  0.019  77  0.018 275
DCP16    .900      0.001    0.070  17  0.094 128  0.033 312  0.033 204  0.011  87  0.011 290  0.016 170  0.007  60  0.015 283
DCP17    .969     -0.040    0.022  17  0.017 164  0.015 311  0.023 213  0.015  40  0.007 306  0.008 107  0.005   8  0.008  40
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR  1

               TUNED HZ   DRIVE HZ    K         MACH NO    DEL.ALPHA   DEL.H     ALPHA.0     TEST POINT  CYCLES ANALYSED
                0.0        45.71       0.232     0.297      5.43        0.0       12.49      12011.6      20

               V          Q           RN        CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               100.4      26530.      0.48E 07  -0.201      1.813       17.98      0.00019   -0.156       0.0
              (329.5)    (554.1)
                                                          HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA           12.488   5.428   0  0.415   9  0.173 276  0.070 337  0.042  73  0.010  80  0.024 238  0.006  76  0.006 121
CN               1.044   0.569  35  0.138 268  0.069 169  0.020 105  0.024 359  0.018 277  0.006 251  0.005 264  0.009 215
CM              -0.033   0.067 178  0.057  27  0.026 287  0.012 178  0.010 130  0.009  34  0.005 295  0.003 219  0.002 144

DCP 1   .010     3.968   1.514  90  1.277  36  0.192  17  0.356 349  0.284 295  0.236 266  0.171 223  0.082 194  0.071 124
DCP 2   .020     3.438   1.412  79  1.035  34  0.133 339  0.167 355  0.214 305  0.220 265  0.174 216  0.108 180  0.113 156
DCP 3   .030     3.062   1.220  63  0.932  38  0.200 357  0.231 339  0.228 284  0.156 244  0.139 212  0.110 168  0.079 142
DCP 4   .049     3.129   1.172  50  0.643  18  0.290 292  0.195 214  0.069 152  0.052 142  0.073  98  0.072  26  0.049 328
DCP 5   .074     2.685   1.052  50  0.510   3  0.207 265  0.129 189  0.049 127  0.035 108  0.050  59  0.045 343  0.036 278
DCP 6   .099     2.412   1.039  48  0.462 347  0.185 240  0.102 160  0.051 128  0.033  80  0.042  32  0.031 327  0.020 291
DCP 7   .149     1.890   1.011  41  0.407 321  0.155 223  0.109 163  0.073 109  0.026  61  0.030  37  0.030 338  0.031 277
DCP 8   .200     1.600   0.958  41  0.391 317  0.175 228  0.126 173  0.056 127  0.061  82  0.069   6  0.046 323  0.041 272
DCP 9   .250     1.433   0.975  32  0.395 294  0.193 205  0.123 150  0.066  68  0.077  43  0.079 321  0.045 269  0.051 235
DCP10   .300     1.292   0.887  29  0.372 262  0.196 191  0.126 127  0.062  66  0.080  18  0.083 307  0.067 257  0.079 194
DCP11   .399     1.097   0.765  31  0.310 276  0.178 189  0.138 132  0.111  55  0.105 342  0.084 284  0.072 225  0.069 170
DCP12   .501     0.825   0.629  26  0.265 249  0.164 156  0.109  81  0.096  14  0.118 300  0.088 219  0.066 158  0.060  93
DCP13   .600     0.668   0.503  22  0.252 223  0.150 123  0.096  40  0.099 336  0.109 256  0.090 171  0.068  93  0.049  30
DCP14   .701     0.546   0.366  19  0.225 201  0.151  93  0.112 350  0.077 263  0.085 203  0.057 106  0.047  24  0.039 311
DCP15   .800     0.355   0.266   4  0.196 165  0.113  60  0.097 321  0.057 264  0.070 162  0.045  66  0.027 359  0.028 289
DCP16   .900     0.067   0.153 348  0.089 178  0.068  75  0.052 295  0.036 249  0.039 152  0.039  46  0.024 312  0.022 219
DCP17   .969    -0.011   0.057 347  0.036 186  0.032  77  0.037 256  0.018 244  0.022 151  0.013  58  0.015 345  0.025 325
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR  1

               TUNED HZ   DRIVE HZ    K         MACH NO    DEL.ALPHA   DEL.H     ALPHA.0     TEST POINT  CYCLES ANALYSED
                0.0        45.67       0.233     0.296      5.39        0.0       15.03      12011.7      20

               V          Q           RN        CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               100.0      26358.      0.48E 07  -0.260      2.033       19.83      0.00045   -0.371       0.0
              (328.0)    (550.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA           15.027   5.390   0  0.391  18  0.189 313  0.071  77  0.037 107  0.016   9  0.016 168  0.031 220  0.011 226
CN               1.177   0.608  42  0.133 334  0.069 249  0.034 203  0.012 196  0.013 106  0.004  96  0.008  66  0.014  34
CM              -0.061   0.114 177  0.063  59  0.033 343  0.006 270  0.003 249  0.009 216  0.005 117  0.003  64  0.002 204

DCP 1   .010     4.013   1.980 124  0.967  67  0.349  87  0.426  96  0.365  49  0.213  50  0.149  12  0.078  30  0.054 322
DCP 2   .020     3.552   1.634 113  0.898  63  0.194  69  0.244 101  0.258  51  0.184  43  0.193  16  0.122  10  0.124 351
DCP 3   .030     3.144   1.450 117  0.776  69  0.340  40  0.205  50  0.190  48  0.153  13  0.117  18  0.114 355  0.082 343
DCP 4   .049     3.278   0.933  87  0.716  62  0.241  11  0.136  14  0.167 331  0.151 283  0.091 249  0.074 239  0.082 205
DCP 5   .074     2.867   0.983  74  0.536  17  0.150 335  0.090 354  0.156 302  0.141 250  0.087 203  0.056 191  0.064 164
DCP 6   .099     2.594   1.067  68  0.504  17  0.159 312  0.058 324  0.133 293  0.137 243  0.094 191  0.054 171  0.049 157
DCP 7   .149     2.039   1.071  58  0.436   3  0.267 309  0.168 239  0.070 240  0.084 226  0.080 176  0.061 130  0.046  62
DCP 8   .200     1.723   0.973  57  0.425  11  0.313 308  0.133 236  0.088 247  0.080 215  0.072 181  0.053 143  0.044 122
DCP 9   .250     1.566   0.969  48  0.395 354  0.300 292  0.156 263  0.122 227  0.110 189  0.107 146  0.093 107  0.091  60
DCP10   .300     1.411   0.873  43  0.342 349  0.289 282  0.177 234  0.167 197  0.110 158  0.103 108  0.089  71  0.089  19
DCP11   .399     1.245   0.820  39  0.267 332  0.257 276  0.197 227  0.160 177  0.135 128  0.123  79  0.094  35  0.071 358
DCP12   .501     1.007   0.749  27  0.246 292  0.238 234  0.159 181  0.122 125  0.129  82  0.127  21  0.098 333  0.064 281
DCP13   .600     0.849   0.686  19  0.279 261  0.219 193  0.124 132  0.097  73  0.102  41  0.108 329  0.071 270  0.068 203
DCP14   .701     0.704   0.554  11  0.295 215  0.219 155  0.112  76  0.080  19  0.087 344  0.075 255  0.047 209  0.048 106
DCP15   .800     0.461   0.412 359  0.249 222  0.205 132  0.099  30  0.077 322  0.035 298  0.067 211  0.028 156  0.027  52
DCP16   .900     0.148   0.243 347  0.133 209  0.107 102  0.052 349  0.036 295  0.029 331  0.033 200  0.027 128  0.025 137
DCP17   .969     0.035   0.123 343  0.066 213  0.067  92  0.046 330  0.024 233  0.008  23  0.018 263  0.022 216  0.013 117
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         45.77        0.234      0.296       5.37         0.0        17.45        12011.8       20

              V            Q            RN         CM(MIN)     CN(MAX)      ALPHA.NMAX AERO DAMP    TOR          EXT DAMP
                99.8        26286.       0.48E 07  -0.313       2.155        20.06      0.00013     -0.111         0.0
              (327.3)      (549.0)                                   HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.454    5.372   0   0.326  21   0.145 357   0.148 149   0.022 191   0.019  15   0.017 177   0.016 314   0.014 187
CN                1.240    0.656  49   0.127  16   0.095 310   0.021 212   0.026 306   0.024 228   0.008 267   0.006 218   0.013 205
CM               -0.080    0.141 182   0.051  98   0.038  47   0.022 321   0.003 326   0.008 326   0.007 221   0.003 232   0.002   5

DCP 1    .010     3.791    2.378 137   0.764 103   0.424 130   0.291 177   0.322 164   0.198 166   0.131 152   0.071 174   0.058 120
DCP 2    .020     3.430    2.033 129   0.687  95   0.327  99   0.084 222   0.210 168   0.153 179   0.204 172   0.142 183   0.155 167
DCP 3    .030     2.964    1.772 127   0.558 129   0.440 100   0.207 160   0.155 126   0.194 139   0.099 143   0.115 138   0.068 167
DCP 4    .049     3.335    1.037 102   0.563  94   0.252  78   0.225  62   0.183  18   0.090  17   0.076  12   0.069   4   0.057   6
DCP 5    .074     2.903    1.078  86   0.324  71   0.194  62   0.164  44   0.195   0   0.101 333   0.058 328   0.056 340   0.055 343
DCP 6    .099     2.631    1.148  78   0.300  51   0.215  37   0.140  35   0.212 357   0.127 322   0.079 296   0.045 313   0.036 309
DCP 7    .149     2.105    1.184  70   0.437  55   0.401 359   0.160 318   0.087 328   0.117 337   0.102 296   0.067 274   0.028 286
DCP 8    .200     1.800    1.103  68   0.457  52   0.376 352   0.158 311   0.063 347   0.107 333   0.080 312   0.066 294   0.057 295
DCP 9    .250     1.644    1.384  58   0.450  37   0.375 334   0.144 306   0.066 324   0.120 297   0.096 280   0.076 255   0.071 243
DCP10    .300     1.460    0.915  53   0.382  34   0.356 335   0.191 295   0.133 292   0.121 257   0.106 241   0.073 221   0.075 200
DCP11    .399     1.336    0.913  44   0.285  19   0.318 326   0.184 281   0.158 276   0.155 235   0.119 208   0.094 198   0.081 169
DCP12    .501     1.122    0.890  31   0.249 336   0.284 286   0.171 229   0.136 226   0.156 183   0.125 135   0.087 122   0.063  95
DCP13    .600     0.954    0.831  21   0.266 303   0.260 248   0.179 181   0.085 171   0.113 147   0.111  67   0.077  61   0.030 359
DCP14    .701     0.778    0.649  11   0.249 270   0.241 209   0.178 137   0.075  96   0.067  84   0.083  21   0.043   3   0.033 287
DCP15    .800     0.528    0.510   2   0.231 255   0.197 181   0.168 108   0.079  48   0.034  17   0.058 321   0.007 324   0.006 166
DCP16    .900     0.196    0.213 355   0.103 245   0.078 173   0.098  89   0.036  28   0.026  21   0.043 326   0.015 290   0.013 180
DCP17    .969     0.050    0.116 356   0.061 226   0.050 142   0.060  71   0.020 297   0.029 142   0.033  37   0.033 333   0.023 248

                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         45.75        0.234      0.295       5.35         0.0        19.94        12011.9       20

              V            Q            RN         CM(MIN)     CN(MAX)      ALPHA.NMAX AERO DAMP    TOR          EXT DAMP
                99.4        26090.       0.48E 07  -0.346       2.182        22.32     -0.00069      0.572         0.0
              (326.2)      (544.9)                                   HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            19.936    5.352   0   0.261  14   0.086  79   0.144 196   0.013 340   0.009  86   0.014 180   0.022 124   0.008 209
CN                1.250    0.658  54   0.122  50   0.140 355   0.022 274   0.017  22   0.018 350   0.009 297   0.009 348   0.009 307
CM               -0.100    0.149 188   0.047 136   0.045 105   0.019  17   0.005 356   0.005  25   0.005   3   0.001 276   0.002 116

DCP 1    .010     3.406    2.280 138   0.803 160   0.271 149   0.355 221   0.286 241   0.162 247   0.118 244   0.059 264   0.051 266
DCP 2    .020     3.182    1.893 133   0.619 150   0.267 106   0.170 233   0.157 249   0.167 270   0.146 278   0.148 301   0.109 303
DCP 3    .030     2.875    1.561 134   0.634 171   0.241 133   0.222 210   0.149 236   0.121 231   0.109 265   0.098 295   0.062 296
DCP 4    .049     2.995    1.310 116   0.441 131   0.324 108   0.102 133   0.190 120   0.063  98   0.079 130   0.049 132   0.053 153
DCP 5    .074     2.648    1.182  99   0.338 123   0.282  76   0.078 116   0.156  95   0.049  81   0.067  82   0.042 118   0.058 114
DCP 6    .099     2.465    1.161  86   0.331 111   0.285  59   0.106  89   0.169  88   0.152  64   0.088  43   0.026  76   0.065 106
DCP 7    .149     2.041    1.052  73   0.423  88   0.324  38   0.135  31   0.122  54   0.097  31   0.048  47   0.056  52   0.052  42
DCP 8    .200     1.776    0.937  73   0.435  84   0.338  44   0.119  16   0.089  59   0.069  58   0.053  88   0.060  74   0.043  62
DCP 9    .250     1.652    0.961  64   0.456  70   0.388  28   0.167   1   0.121  17   0.095  25   0.087   9   0.071   3   0.042 345
DCP10    .300     1.520    0.876  56   0.402  62   0.389  21   0.194 353   0.149 355   0.105 358   0.086 336   0.066 331   0.065 323
DCP11    .399     1.409    0.919  47   0.318  45   0.370  13   0.182 343   0.169 334   0.126 330   0.098 309   0.079 303   0.072 285
DCP12    .501     1.189    0.910  35   0.274   8   0.326 336   0.151 296   0.131 286   0.122 275   0.100 250   0.065 230   0.065 228
DCP13    .600     1.001    0.856  27   0.271 337   0.302 303   0.159 241   0.098 232   0.089 227   0.081 206   0.058 167   0.030 153
DCP14    .701     0.827    0.716  17   0.240 305   0.267 271   0.180 195   0.096 158   0.095 146   0.047 137   0.039  96   0.015  48
DCP15    .800     0.590    0.518  11   0.176 287   0.193 251   0.166 170   0.104 126   0.053  95   0.027  59   0.024  17   0.004 311
DCP16    .900     0.261    0.289   5   0.088 253   0.079 234   0.076 143   0.065 109   0.036 131   0.034  89   0.022 345   0.013 337
DCP17    .969     0.085    0.143  10   0.062 251   0.047 203   0.070 116   0.035  24   0.025 233   0.045 168   0.036  87   0.041   2
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0      69.07      0.333      0.310      5.95       0.0        0.03      12013.1      20

               V         Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               105.5      28733.     0.50E 07  -0.062      0.485      6.04      -0.00086    0.775       0.0
              (346.0)    (600.1)                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               0.035   5.953   0  0.520 343  0.151 203  0.077 136  0.016 189  0.018  27  0.010 223  0.018  97  0.006  41
CN                  0.113   0.367  16  0.038  33  0.006 267  0.002 244  0.005 275  0.001 172  0.003 201  0.003 190  0.002 127
CM                 -0.016   0.041 293  0.008 280  0.001 161  0.001 141  0.001 142  0.000 359  0.001  34  0.000  38  0.001 279

DCP 1    .010      -0.652   2.756 344  0.280 357  0.057 134  0.019  97  0.025 154  0.008 190  0.007 315  0.010  92  0.011 127
DCP 2    .020      -0.355   1.991 353  0.169 344  0.032 201  0.004 141  0.013 198  0.006 167  0.009 239  0.004  39  0.007 156
DCP 3    .030      -0.046   1.648 353  0.135 347  0.028 219  0.007 197  0.014 214  0.003  26  0.003 194  0.001 217  0.005 154
DCP 4    .049       0.067   1.336 355  0.108 340  0.026 207  0.008 174  0.011 176  0.007 262  0.006 106  0.006 212  0.007  20
DCP 5    .074       0.243   1.070 356  0.093 350  0.023 197  0.007 165  0.006 186  0.003 355  0.004  77  0.004 171  0.002 138
DCP 6    .099       0.335   0.924 359  0.080 355  0.022 231  0.006 131  0.012 209  0.002  18  0.005 147  0.003 316  0.004 175
DCP 7    .149       0.210   0.687   3  0.068   4  0.013 249  0.007 165  0.007 229  0.003 347  0.005 197  0.004 203  0.003 327
DCP 8    .200       0.186   0.567  14  0.052  26  0.013 286  0.007 257  0.011 296  0.004 151  0.003  86  0.004 193  0.006 180
DCP 9    .250       0.154   0.498  12  0.053  27  0.009 275  0.007 174  0.014 261  0.005 335  0.004  77  0.001  13  0.001  94
DCP10    .300       0.177   0.423  15  0.047  28  0.010 260  0.005 157  0.008 252  0.006  88  0.009 217  0.010 163  0.004 200
DCP11    .399       0.176   0.351  35  0.047  56  0.012 308  0.008 166  0.008 313  0.003 246  0.004 201  0.011 216  0.007 107
DCP12    .501       0.116   0.293  42  0.046  55  0.010 306  0.004 231  0.006 262  0.003 187  0.004  17  0.011 153  0.002 166
DCP13    .600       0.140   0.240  56  0.042  72  0.004 293  0.015 306  0.001 137  0.006 156  0.009 201  0.005 133  0.004 216
DCP14    .701       0.184   0.191  62  0.037  70  0.004 266  0.001 117  0.007 323  0.003 180  0.004  18  0.004 284  0.005 123
DCP15    .800       0.062   0.137  74  0.026  86  0.008 347  0.010 332  0.010 333  0.004  31  0.006 203  0.005 321  0.004  17
DCP16    .900      -0.075   0.079 101  0.020 106  0.005 319  0.006 317  0.005 328  0.004 267  0.012 226  0.002 304  0.008  69
DCP17    .969      -0.031   0.030 176  0.003 197  0.009 156  0.006  94  0.005 221  0.007 174  0.003 141  0.006 197  0.005 176
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0      69.14      0.340      0.306      5.96       0.0        2.47      12013.2      20

               V         Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               103.7      27948.     0.49E 07  -0.056      0.717      7.79      -0.00086    0.763       0.0
              (340.1)    (583.7)                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               2.472   5.955   0  0.508 343  0.168 190  0.069 136  0.026 336  0.014   2  0.025 193  0.014 120  0.001 145
CN                  0.335   0.374  15  0.038  33  0.010 261  0.004 258  0.005 311  0.000 244  0.004 199  0.003  93  0.001  60
CM                 -0.012   0.041 293  0.007 279  0.002 162  0.002 112  0.001 147  0.000 127  0.001 359  0.001 232  0.001 339

DCP 1    .010       0.864   2.581 344  0.207 340  0.052 172  0.011 110  0.018 196  0.007 111  0.003 264  0.006 306  0.003 279
DCP 2    .020       0.760   2.000 353  0.194 348  0.034 247  0.004  49  0.010 239  0.002  63  0.011 193  0.001  53  0.010   5
DCP 3    .030       0.908   1.669 352  0.132 345  0.028 242  0.009 104  0.014 238  0.005 235  0.014 135  0.003 117  0.006 231
DCP 4    .049       0.675   1.392 354  0.111 343  0.038 223  0.011 147  0.005 328  0.004 280  0.009 158  0.006 146  0.007  71
DCP 5    .074       0.885   1.105 355  0.088 349  0.030 222  0.007 157  0.009 262  0.003 135  0.004 206  0.006 190  0.007  65
DCP 6    .099       0.884   0.936 358  0.074   2  0.025 237  0.003  30  0.011 310  0.000 120  0.008 211  0.009 166  0.004  51
DCP 7    .149       0.623   0.693   3  0.061   2  0.022 224  0.006 207  0.008   2  0.004  96  0.005 322  0.004 136  0.006  26
DCP 8    .200       0.514   0.573  13  0.057  30  0.020 264  0.005 261  0.007 331  0.010 206  0.010 224  0.004  79  0.006   9
DCP 9    .250       0.440   0.516  13  0.054  25  0.017 265  0.010 220  0.008 254  0.009  64  0.009 162  0.008 173  0.006 301
DCP10    .300       0.431   0.437  16  0.056  26  0.011 228  0.008 280  0.012 304  0.005 155  0.007 264  0.005  57  0.004 251
DCP11    .399       0.378   0.370  34  0.056  55  0.008 269  0.004 237  0.004 340  0.004 279  0.003 281  0.005  59  0.002 283
DCP12    .501       0.255   0.299  42  0.046  56  0.004 287  0.009 236  0.001 147  0.004 321  0.008 174  0.005  87  0.002 212
DCP13    .600       0.242   0.243  51  0.035  70  0.014 293  0.009 200  0.008 284  0.003  93  0.004 160  0.007 152  0.012  75
DCP14    .701       0.258   0.166  61  0.031  72  0.013 296  0.019 276  0.008 311  0.007 322  0.013 215  0.003 349  0.007 138
DCP15    .800       0.126   0.139  74  0.024  69  0.008 310  0.007 346  0.002 335  0.009 116  0.001  98  0.005 203  0.006 167
DCP16    .900      -0.058   0.070 101  0.022 121  0.007  53  0.007   9  0.009 327  0.011 267  0.007  23  0.011  47  0.004 318
DCP17    .969      -0.035   0.039 157  0.010 126  0.010   9  0.002   8  0.009 351  0.009 356  0.010 156  0.010  13  0.006 226
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                                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                      TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                        0.0         69.15        0.343        0.303        5.95         0.0           5.02       12013.3       20

                      V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                       102.7        27474.       0.49E 07    -0.054        0.965        10.64       -0.00091      0.796        0.0
                      (336.8)      (573.8)                                 HARMONIC ANALYSIS
DATA
TYPE         X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                   5.020      5.967   0    0.498 342    0.137 191    0.060 129    0.039 334    0.014  59    0.028 193    0.013 117    0.003 206
CN                      0.572      0.366  17    0.037  33    0.013 258    0.003 210    0.005 310    0.003 145    0.003  56    0.001 228    0.002 331
CM                     -0.008      0.044 296    0.007 277    0.003 115    0.001 136    0.001 167    0.001 320    0.001 196    0.001 121    0.001 128

DCP 1        .010       2.454      2.505 344    0.196 344    0.016 219    0.031 195    0.061 175    0.024  49    0.035 337    0.013  56    0.011 329
DCP 2        .020       2.001      2.025 353    0.163 347    0.045 173    0.002  79    0.020 210    0.013  49    0.008  56    0.012  78    0.005 328
DCP 3        .030       1.930      1.710 352    0.140 346    0.034 175    0.008  54    0.017 236    0.005   1    0.006 340    0.035   9    0.004 346
DCP 4        .049       1.747      1.414 354    0.109 349    0.024 203    0.004 267    0.006 311    0.009 258    0.010 116    0.002 140    0.007  88
DCP 5        .076       1.571      1.116 356    0.087 355    0.016 186    0.002 150    0.006 316    0.006 251    0.004 100    0.006 134    0.006   7
DCP 6        .099       1.463      0.935 359    0.081   0    0.018 192    0.001 246    0.005 359    0.006 241    0.011  76    0.004 146    0.006  70
DCP 7        .149       1.058      0.699   3    0.062  10    0.020 235    0.005 156    0.009 251    0.006 251    0.008 159    0.004 150    0.004 283
DCP 8        .200       0.872      0.574  14    0.056  26    0.017 234    0.007 164    0.004 345    0.004 256    0.009 343    0.004 152    0.004 100
DCP 9        .250       0.736      0.502  14    0.057  27    0.021 273    0.014 191    0.009 265    0.004 116    0.003 113    0.008 121    0.009 308
DCP10        .300       0.665      0.426  17    0.051  35    0.019 248    0.009 202    0.009 284    0.007  78    0.007 116    0.005 160    0.005  63
DCP11        .399       0.563      0.361  37    0.045  62    0.013 251    0.008 186    0.010 341    0.005 119    0.002 154    0.005 169    0.005  31
DCP12        .501       0.414      0.301  45    0.036  54    0.016 274    0.002 255    0.010 351    0.006 219    0.008  66    0.004 286    0.003 297
DCP13        .600       0.353      0.249  56    0.037  70    0.018 276    0.009 192    0.011 306    0.004 106    0.013  41    0.007 334    0.016 292
DCP14        .701       0.344      0.184  67    0.030  82    0.018 300    0.005 277    0.004 283    0.005 179    0.005 296    0.007 286    0.007 176
DCP15        .800       0.176      0.141  80    0.031  77    0.018 304    0.006 356    0.003 234    0.009 140    0.002 323    0.005 226    0.001 316
DCP16        .900      -0.044      0.077 102    0.013  93    0.007 189    0.011 324    0.006  23    0.009 151    0.002  38    0.003 314    0.006  32
DCP17        .969      -0.046      0.028 136    0.006  26    0.015 303    0.008  89    0.006  59    0.007  35    0.002  24    0.004  46    0.005 323
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                                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                      TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                        0.0         69.22        0.344        0.303        5.96         0.0           7.49       12013.4       20

                      V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TOR          EXT DAMP
                      102.4         27416.       0.49E 07    -0.053        1.173        12.51       -0.00102      0.892        0.0
                     (336.0)       (572.6)                                 HARMONIC ANALYSIS
DATA
TYPE         X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                   7.493      5.939   0    0.517 342    0.117 198    0.065 134    0.028 342    0.023  89    0.021 207    0.007 107    0.006 308
CN                      0.786      0.371  20    0.063  34    0.009 285    0.003 304    0.005 307    0.004 192    0.003 324    0.004 171    0.002 137
CM                     -0.001      0.048 291    0.007 278    0.002 132    0.001 143    0.001 185    0.001  17    0.002 167    0.001  23    0.001   3

DCP 1        .010       3.877      2.408 345    0.235 345    0.099 160    0.104  59    0.074 291    0.018 246    0.029 221    0.012 195    0.015 195
DCP 2        .020       3.150      1.957 353    0.162   3    0.026 316    0.021 235    0.023 240    0.014 163    0.006 267    0.008 171    0.009 295
DCP 3        .030       2.920      1.697 353    0.141 349    0.009 229    0.013 198    0.006 236    0.013 142    0.005 266    0.009 151    0.007  23
DCP 4        .049       2.562      1.402 355    0.124 354    0.015 240    0.012 225    0.008 245    0.010 164    0.006 266    0.002  99    0.006  47
DCP 5        .076       2.217      1.103 356    0.103 359    0.010 262    0.005 225    0.004 294    0.006 194    0.002 319    0.006 114    0.006  82
DCP 6        .099       1.998      0.928   0    0.091   5    0.011 288    0.009 189    0.010 284    0.003 178    0.001 253    0.002 109    0.006  72
DCP 7        .149       1.462      0.700   4    0.079  13    0.002 262    0.008 142    0.003 279    0.006 152    0.011 152    0.012 155    0.006 108
DCP 8        .200       1.200      0.573  14    0.067  29    0.011 256    0.013 259    0.005 308    0.009 258    0.009 310    0.009  91    0.006 170
DCP 9        .250       1.022      0.505  16    0.055  19    0.009 253    0.006 305    0.004 235    0.004 179    0.002 270    0.002  92    0.009 315
DCP10        .300       0.918      0.426  20    0.060  20    0.006 254    0.004 285    0.006 329    0.005 139    0.001  24    0.003 301    0.010  66
DCP11        .399       0.768      0.361  39    0.051  52    0.011 278    0.010 303    0.003 329    0.004 247    0.002 147    0.010 159    0.008 155
DCP12        .501       0.554      0.306  49    0.051  68    0.011 310    0.003   7    0.011 300    0.004 215    0.007 331    0.003 247    0.008 136
DCP13        .600       0.454      0.264  60    0.042  66    0.014 300    0.002  77    0.011 208    0.008 151    0.003  12    0.005 162    0.007 140
DCP14        .701       0.403      0.218  69    0.063  84    0.022 311    0.008 342    0.001 103    0.008 249    0.007 283    0.005 246    0.005 321
DCP15        .800       0.202      0.164  63    0.032  73    0.010 296    0.006 351    0.006 346    0.002 185    0.012 355    0.001  32    0.009 236
DCP16        .900      -0.035      0.090  94    0.009 125    0.005  17    0.007 270    0.008  96    0.011 206    0.012 355    0.001  95    0.007 216
DCP17        .969      -0.054      0.033 101    0.006  40    0.006 214    0.006 144    0.009 346    0.009  96    0.003 207    0.020 196    0.012  35
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

            TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
              0.0         69.20        0.346         0.301        5.91         0.0          10.01       12013.5        20

              V            Q           RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
            101.9         27195.       0.48E 07     -0.050        1.390        15.70       -0.00077      0.673        0.0
           (334.4)       (568.0)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             10.036    5.909   0   0.572 339   0.082 191   0.048 131   0.030  24   0.031 106   0.025 194   0.011 140   0.005 250
CN                 0.928    0.436  22   0.039  99   0.041 328   0.033 195   0.020  56   0.007 277   0.008 142   0.008 321   0.008 211
CM                -0.001    0.032 271   0.025 311   0.011 146   0.006 349   0.005 194   0.003  66   0.003 326   0.002 177   0.002  84

DCP 1     .010     4.405    1.809   8   0.883 356   0.454 245   0.258 148   0.095  47   0.060 207   0.125  96   0.092   4   0.057 291
DCP 2     .020     3.542    1.526  20   0.841   5   0.514 255   0.329 150   0.150  51   0.030  18   0.060   7   0.076 275   0.039 173
DCP 3     .030     3.134    1.349  29   0.805 353   0.391 237   0.141 145   0.107 120   0.148  41   0.100 314   0.071 248   0.073 187
DCP 4     .049     3.101    1.384   2   0.146 359   0.024 272   0.018 108   0.015 331   0.015 180   0.008  16   0.009 215   0.010 156
DCP 5     .074     2.632    1.096   5   0.115   3   0.006 340   0.003  12   0.015 275   0.027 143   0.009  52   0.011 236   0.004 181
DCP 6     .099     2.336    0.945   9   0.098   1   0.007 294   0.013 263   0.002 258   0.015 106   0.007 289   0.013 202   0.006 131
DCP 7     .149     1.745    0.771  12   0.069 323   0.025 124   0.009 277   0.004 330   0.005 119   0.309 307   0.011 147   0.013  64
DCP 8     .200     1.459    0.714  18   0.079 253   0.070  94   0.033 299   0.007 123   0.013 249   0.008 190   0.008 284   0.003 258
DCP 9     .250     1.282    0.694  10   0.135 191   0.122  43   0.069 258   0.033 106   0.001 302   0.004  57   0.016 267   0.015 160
DCP10     .300     1.160    0.601   7   0.155 171   0.125  26   0.080 253   0.033 125   0.023 332   0.032 161   0.027 351   0.031 206
DCP11     .399     0.935    0.468  26   0.145 161   0.106  17   0.073 242   0.042 100   0.023 317   0.009 191   0.013 352   0.012 192
DCP12     .501     0.655    0.349  36   0.121 126   0.104 337   0.074 197   0.052  59   0.028 289   0.018 146   0.008 271   0.004 152
DCP13     .600     0.491    0.299  51   0.107 111   0.083 314   0.061 167   0.040  41   0.025 243   0.020 131   0.016 339   0.020 245
DCP14     .701     0.408    0.268  61   0.086 116   0.067 299   0.046 157   0.031   7   0.010 228   0.014 147   0.011 323   0.008 114
DCP15     .800     0.218    0.167  65   0.073 105   0.038 282   0.025 141   0.024 350   0.005 214   0.013 143   0.009 344   0.003 305
DCP16     .900    -0.004    0.050  67   0.059  81   0.033 253   0.026 115   0.020 334   0.008 187   0.013  25   0.011  93   0.020 294
DCP17     .969    -0.041    0.021 126   0.025  72   0.010 266   0.014  52   0.011 302   0.008 190   0.016 192   0.016 327   0.009 224
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

            TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
              0.0         69.21        0.347         0.300        5.91         0.0          12.48       12013.6        20

              V            Q           RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
            101.5         27033.       0.48E 07     -0.175        1.698        18.58        0.00042     -0.365        0.0
           (333.1)       (564.6)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             12.476    5.914   0   0.659 335   0.051 128   0.043 152   0.029  67   0.021 125   0.016 168   0.011 144   0.008  51
CN                 1.043    0.620  19   0.069 197   0.030  90   0.024  19   0.013 238   0.016 277   0.015 171   0.012  69   0.002 297
CM                -0.031    0.047 152   0.063 323   0.022 106   0.008 111   0.011 346   0.006 153   0.002 298   0.005 197   0.003  81

DCP 1     .010     3.894    1.593  64   1.159  16   0.262 355   0.403 300   0.261 226   0.172 181   0.093 130   0.022  96   0.008 323
DCP 2     .020     3.330    1.648  60   0.968  11   0.127 338   0.295 316   0.270 238   0.205 184   0.140 143   0.107 103   0.084  50
DCP 3     .030     2.925    1.535  66   0.899   9   0.194 343   0.306 289   0.159 210   0.139 206   0.150 146   0.084  91   0.106  70
DCP 4     .049     3.078    1.336  35   0.614 159   0.275 252   0.130 163   0.069 122   0.079  70   0.083 348   0.058 264   0.037 189
DCP 5     .074     2.688    1.277  31   0.482 332   0.239 215   0.123 127   0.061  78   0.066  23   0.050 311   0.042 230   0.036 195
DCP 6     .099     2.433    1.258  29   0.407 312   0.193 169   0.086 114   0.057  76   0.060   9   0.041 302   0.054 248   0.046 158
DCP 7     .149     1.886    1.175  24   0.342 282   0.154 178   0.123 124   0.089  36   0.065 325   0.061 254   0.043 185   0.031 120
DCP 8     .200     1.639    1.116  23   0.323 271   0.166 180   0.117 115   0.094  51   0.091 336   0.062 276   0.082 212   0.071 130
DCP 9     .250     1.475    1.125  14   0.347 242   0.202 150   0.142  76   0.121   6   0.117 277   0.085 200   0.092 120   0.073  38
DCP10     .300     1.333    1.005  11   0.338 227   0.178 129   0.130  65   0.136 344   0.119 241   0.083 173   0.105  88   0.059 341
DCP11     .399     1.110    0.810  15   0.316 213   0.195 113   0.138  37   0.155 311   0.128 205   0.082 148   0.092  58   0.069 317
DCP12     .501     0.831    0.623   9   0.306 180   0.193  69   0.145 346   0.172 244   0.107 126   0.058  69   0.069 337   0.050 227
DCP13     .600     0.662    0.465   6   0.319 155   0.173  34   0.113 313   0.156 207   0.092  68   0.040   8   0.054 269   0.024 186
DCP14     .701     0.536    0.267 359   0.297 124   0.143 342   0.074 254   0.123 151   0.093 350   0.028 233   0.018 142   0.019  29
DCP15     .800     0.324    0.153 340   0.248 107   0.129 314   0.047 199   0.074 109   0.067 303   0.018 146   0.030  63   0.021 279
DCP16     .900     0.058    0.071 320   0.128 100   0.074 308   0.047 218   0.062  85   0.065 278   0.008  70   0.017  16   0.022 170
DCP17     .969    -0.020    0.016 354   0.049 103   0.031 306   0.012 275   0.027 112   0.020 338   0.021 239   0.016 352   0.001 282
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
           0.0        69.13      0.348        0.299       5.88        0.0          15.03       12013.7      20

          V          Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP   TDR         EXT DAMP
          101.1       26832.      0.48E 07   -0.245       1.969       21.27        0.00163    -1.406        0.0
         (331.7)     (560.4)
                                                    HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               15.034    5.881   0   0.709 339   0.097 117   0.030 176   0.014 115   0.020 140   0.020 169   0.012 151   0.012  95
CN                   1.161    0.687  20   0.032 230   0.043 219   0.012 120   0.010  96   0.014   6   0.015 256   0.003 265   0.002 164
CM                  -0.073    0.108 136   0.071 330   0.003 218   0.012 194   0.006  81   0.000 221   0.005  31   0.000 340   0.002 242

DCP 1     .010       3.678    2.197  86   0.547  23   0.618  55   0.296   5   0.292 326   0.138 308   0.108 267   0.031 280   0.028 173
DCP 2     .020       3.264    2.066  81   0.643  19   0.373  57   0.194   5   0.220 336   0.142 321   0.168 289   0.106 247   0.087 220
DCP 3     .033       2.871    1.736  88   0.702  35   0.391  42   0.234 340   0.138 328   0.132 297   0.074 274   0.086 257   0.079 234
DCP 4     .049       3.145    1.271  59   0.653  24   0.228 336   0.208 292   0.192 227   0.105 173   0.079 147   0.079 110   0.070  66
DCP 5     .074       2.763    1.302  49   0.504 358   0.174 307   0.234 261   0.182 187   0.069 136   0.099 110   0.079  54   0.052   9
DCP 6     .099       2.544    1.371  45   0.446 339   0.161 296   0.221 247   0.179 170   0.079 113   0.066  90   0.059  45   0.050 358
DCP 7     .149       2.025    1.390  36   0.409 317   0.230 265   0.186 206   0.159 153   0.097  93   0.057  40   0.042  13   0.047 316
DCP 8     .200       1.727    1.335  37   0.420 315   0.248 250   0.228 212   0.188 138   0.107  91   0.090  36   0.068   3   0.064 283
DCP 9     .250       1.542    1.255  28   0.383 299   0.282 232   0.252 173   0.207  90   0.115  29   0.105 339   0.093 279   0.057 240
DCP10     .300       1.413    1.166  22   0.384 283   0.315 205   0.261 138   0.201  60   0.125 348   0.102 299   0.093 227   0.074 192
DCP11     .399       1.276    1.020  18   0.326 260   0.308 191   0.238 110   0.203  35   0.162 324   0.129 260   0.098 187   0.061 142
DCP12     .501       1.065    0.861   0   0.344 207   0.244 142   0.238  55   0.189 324   0.123 248   0.101 192   0.064  96   0.043  67
DCP13     .600       0.893    0.698 343   0.393 167   0.164  93   0.193   9   0.153 272   0.097 177   0.047 121   0.051  11   0.011 260
DCP14     .701       0.738    0.512 325   0.412 138   0.143  22   0.127 317   0.119 209   0.061 101   0.009 336   0.031 305   0.014 129
DCP15     .800       0.477    0.356 311   0.348 121   0.159 338   0.073 265   0.065 165   0.041  41   0.029 213   0.008  21   0.006  15
DCP16     .900       0.178    0.164 296   0.202 101   0.387 299   0.044 268   0.045 144   0.028  16   0.019 171   0.008  98   0.022 341
DCP17     .969       0.048    0.076 277   0.102  98   0.056 294   0.024 242   0.014 299   0.023 152   0.028 358   0.027 208   0.035  19

                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
           0.0        69.16      0.349        0.299       5.84        0.0          17.51       12013.8      20

          V          Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP   TDR         EXT DAMP
          100.9       26770.      0.48E 07   -0.303       2.144       23.17        0.00179    -1.544        0.0
         (330.9)     (559.1)
                                                    HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               17.512    5.815   0   0.734 346   0.127 121   0.031 181   0.019 200   0.007  61   0.018 169   0.013 137   0.017 130
CN                   1.260    0.898  29   0.090 312   0.029 228   0.021 219   0.024 202   0.029 100   0.015 344   0.003  53   0.014  11
CM                  -0.093    0.139 147   0.066   2   0.007 308   0.012 269   0.007 133   0.033 249   0.006 128   0.003  58   0.004 221

DCP 1     .010       3.482    2.429 105   0.451  85   0.436  86   0.411  79   0.232  79   0.158  59   0.099  40   0.043  50   0.015 322
DCP 2     .020       3.237    2.154  99   0.446  59   0.291  87   0.228  86   0.165  92   0.195  75   0.151  50   0.092  36   0.067  40
DCP 3     .033       2.934    1.763 108   0.581  67   0.395  78   0.144  57   0.162  68   0.118  47   0.082  33   0.052  40   0.057  34
DCP 4     .049       3.253    1.259  82   0.572  40   0.260  94   0.244 353   0.126 305   0.075 324   0.090 283   0.051 267   0.067 251
DCP 5     .074       2.882    1.272  67   0.441  17   0.247  35   0.272 316   0.149 262   0.094 262   0.091 243   0.057 190   0.042 195
DCP 6     .099       2.621    1.328  60   0.416   4   0.231  17   0.295 299   0.162 246   0.079 236   0.106 212   0.059 152   0.034 158
DCP 7     .149       2.089    1.377  51   0.531 352   0.203 305   0.207 268   0.189 238   0.106 182   0.056 168   0.042 114   0.014 126
DCP 8     .200       1.804    1.290  54   0.623 355   0.223 296   0.222 283   0.193 237   0.118 183   0.078 158   0.044 116   0.024 104
DCP 9     .250       1.675    1.276  42   0.626 337   0.294 263   0.282 241   0.221 179   0.162 141   0.105  68   0.085  70   0.072  35
DCP10     .300       1.536    1.176  34   0.600 325   0.332 246   0.290 210   0.223 148   0.153  97   0.107  50   0.065  12   0.072 353
DCP11     .399       1.399    1.397  27   0.489 308   0.355 228   0.267 181   0.213 119   0.166  71   0.148  17   0.077 328   0.076 314
DCP12     .501       1.195    0.995   6   0.390 253   0.292 177   0.246 118   0.178  39   0.112 355   0.110 292   0.041 245   0.010 179
DCP13     .600       0.997    0.859 349   0.408 208   0.214 130   0.197  73   0.151 337   0.052 272   0.052 239   0.033 148   0.017  38
DCP14     .701       0.818    0.669 331   0.407 171   0.169  62   0.123  13   0.109 277   0.031 181   0.011 181   0.015  71   0.009  12
DCP15     .800       0.555    0.491 319   0.360 152   0.161  31   0.085 323   0.072 225   0.032  71   0.029 268   0.005 171   0.008 134
DCP16     .900       0.247    0.188 309   0.227 125   0.070 335   0.033 344   0.051 232   0.014 118   0.024 299   0.027 194   0.028  32
DCP17     .969       0.086    0.099 305   0.128 128   0.076 327   0.027 164   0.094 336   0.049 195   0.030  51   0.051 257   0.047  97
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                        FORCED   PITCHING   OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H          ALPHA.0       TEST POINT   CYCLES ANALYSED
                0.0          69.11        0.349         0.299        5.83          0.0            19.95        12013.9        20

              V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX     AERO DAMP     TDR          EXT DAMP
              100.9         26755.        0.48E 07    -0.324         2.278        25.01          0.00106      -0.917         0.0
             (331.0)       (558.8)
                                                                   HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                19.954     5.831   0    0.662 352    0.131 149    0.033 176    0.028 176    0.007  60    0.023 166    0.013 155    0.012 109
CN                    1.294     0.726  37    0.170 335    0.038 246    0.037 306    0.035 220    0.016 174    0.010 103    0.009 178    0.005 108
CM                   -0.114     0.145 165    0.053  47    0.013 351    0.004 309    0.004 296    0.002  25    0.005 253    0.001 142    0.002 303

DCP 1      .010       3.277     2.238 120    0.614 101    0.506 121    0.294 139    0.226 123    0.166 121    0.049 142    0.083 111    0.026 152
DCP 2      .020       3.076     1.921 115    0.533  90    0.318 126    0.162 141    0.184 152    0.188 145    0.127 143    0.128 136    0.069 143
DCP 3      .030       2.760     1.605 111    0.527 107    0.243 121    0.169 100    0.177 154    0.110 142    0.090 141    0.079 161    0.082 186
DCP 4      .049       3.049     1.376  97    0.474  44    0.293 112    0.257  32    0.040  15    0.085  50    0.075  28    0.043  34    0.059  35
DCP 5      .074       2.693     1.327 ˉ79    0.381  30    0.236  81    0.266  12    0.104 336    0.091 354    0.099 330    0.045 323    0.065 336
DCP 6      .099       2.492     1.377  67    0.384  23    0.192  58    0.291   0    0.129 311    0.069 338    0.111 323    0.077 279    0.043 264
DCP 7      .149       2.060     1.307  56    0.547  16    0.181 353    0.234 330    0.118 294    0.115 302    0.102 264    0.052 229    0.038 244
DCP 8      .200       1.828     1.245  60    0.662  16    0.239 348    0.243 327    0.168 295    0.117 291    0.105 253    0.043 251    0.050 265
DCP 9      .250       1.695     1.211  47    0.680 356    0.297 307    0.260 285    0.199 243    0.136 213    0.120 177    0.066 166    0.045 142
DCP10      .300       1.571     1.109  41    0.633 348    0.337 290    0.266 260    0.210 211    0.153 169    0.114 133    0.071 125    0.054  86
DCP11      .399       1.483     1.112  35    0.575 336    0.371 273    0.241 240    0.176 200    0.143 153    0.097 119    0.049 115    0.048  62
DCP12      .501       1.279     0.998  16    0.445 295    0.315 226    0.194 170    0.128 128    0.102  76    0.092  37    0.030 346    0.023 342
DCP13      .600       1.060     0.870   4    0.376 257    0.253 182    0.163 118    0.079  67    0.067   8    0.041 358    0.025 240    0.020 166
DCP14      .701       0.850     0.648 352    0.319 217    0.206 131    0.134  49    0.035 351    0.032 275    0.013 340    0.015 159    0.006 122
DCP15      .800       0.625     0.463 343    0.268 185    0.161 100    0.134  10    0.061 262    0.026 151    0.039 332    0.015 228    0.009  84
DCP16      .900       0.310     0.246 339    0.174 155    0.086  36    0.033 335    0.017 346    0.032 231    0.022 127    0.015 303    0.019 142
DCP17      .969       0.154     0.173 328    0.169 151    0.131  18    0.081 238    0.078  74    0.071 285    0.063 157    0.039   9    0.029 244
                        FORCED   PITCHING   OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H          ALPHA.0       TEST POINT   CYCLES ANALYSED
                0.0          23.09        0.088         0.396        5.16          0.0             0.05        12017.1        20

              V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX     AERO DAMP     TDR          EXT DAMP
              134.3         17558.        0.24E 07    -0.039         0.610         5.00         -0.00088       0.950         0.0
             (440.7)       (366.7)
                                                                   HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 0.045     5.157   0    0.237   9    0.048 261    0.002   7    0.013 355    0.019 102    0.026 190    0.001 168    0.006 354
CN                    0.146     0.462 355    0.013 347    0.001   8    0.001  59    0.002 285    0.001 168    0.001  53    0.003 312    0.002 211
CM                   -0.021     0.015 311    0.002 351    0.001 345    0.000 196    0.001 284    0.000  71    0.001 240    0.001 249    0.001  38

DCP 1      .010      -0.639     3.235 348    0.162  22    0.017  85    0.004  49    0.016 272    0.015 135    0.011 266    0.023 270    0.006   3
DCP 2      .020      -0.229     2.302 351    0.094 308    0.017  27    0.064 215    0.070 295    0.035  32    0.005  80    0.032 303    0.017  69
DCP 3      .030      -0.002     1.997 351    0.078 311    0.020 333    0.002  36    0.011 267    0.007 155    0.007 280    0.013 286    0.006 162
DCP 4      .049       0.211     1.643 351    0.058 319    0.009 326    0.004  40    0.015 252    0.003 123    0.005 278    0.014 279    0.006  67
DCP 5      .074       0.333     1.341 351    0.048 334    0.001  51    0.004 104    0.009 265    0.005 104    0.004 304    0.016 257    0.002 316
DCP 6      .099       0.356     1.157 352    0.043 334    0.006  37    0.005  46    0.009 287    0.001 159    0.006  86    0.014 276    0.007  71
DCP 7      .149       0.256     0.863 352    0.032  15    0.020 355    0.009 173    0.002 261    0.008 173    0.002 162    0.013 305    0.001 281
DCP 8      .200       0.218     0.703 355    0.020 352    0.006  12    0.005  84    0.011 302    0.004  76    0.001 343    0.013 279    0.004 276
DCP 9      .250       0.222     0.619 355    0.024   2    0.003 270    0.003  52    0.001   0    0.003 220    0.001 187    0.007 295    0.002 123
DCP10      .300       0.200     0.511 355    0.022 349    0.003 336    0.003 150    0.006 237    0.005 228    0.001 313    0.005  70    0.002 185
DCP11      .399       0.189     0.412   0    0.011   5    0.002 262    0.001 290    0.002 320    0.009 167    0.001 338    0.002 118    0.033  97
DCP12      .501       0.141     0.309   1    0.008  27    0.003  17    0.005   9    0.003  58    0.005 321    0.004  88    0.001 166    0.004 266
DCP13      .600       0.198     0.235   5    0.006  53    0.003 332    0.006   1    0.003  32    0.003   8    0.005  59    0.002 104    0.004 185
DCP14      .701       0.221     0.158   7    0.001 102    0.007 198    0.001  28    0.003  85    0.001 207    0.006  57    0.004 347    0.008 264
DCP15      .800       0.118     0.078  22    0.009 213    0.008 118    0.001 121    0.001 113    0.001 135    0.004 229    0.004   9    0.006 215
DCP16      .900      -0.075     0.022  62    0.010 207    0.004 206    0.002   0    0.005 256    0.002 249    0.004   8    0.006  59    0.007 182
DCP17      .969      -0.042     0.031 169    0.001 294    0.005 137    0.006 169    0.004 149    0.002 122    0.003 146    0.007  86    0.004  35
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED        DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0          23.11        0.088        0.395        5.17          0.0          2.47        12017.2       20

          V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
         133.4         17376.        0.24E 07    -0.036        0.845          7.57       -0.00083      0.888        0.0
        (437.8)       (362.9)
                                                          HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.472    5.168   0    0.238   9    0.043 262    0.004 216    0.022 337    0.017 134    0.024 190    0.001 246    0.006 337
CN                  0.383    0.468 355    0.017   1    0.004 334    0.003 192    0.004 267    0.004 238    0.003  32    0.005 331    0.003  71
CM                 -0.015    0.014 310    0.001 341    0.001 136    0.001  13    0.000  98    0.001  70    0.001 215    0.003 170    0.001 266

DCP 1     .010      0.996    3.077 348    0.118   7    0.004  23    0.013  84    0.021 284    0.014 171    0.007 131    0.015 171    0.006  34
DCP 2     .020      0.948    2.497 351    0.097 329    0.048 154    0.033  96    0.051 302    0.018 296    0.011 118    0.025 184    0.009  83
DCP 3     .030      1.006    2.034 351    0.071   5    0.059 329    0.015 258    0.018 154    0.012 104    0.004 250    0.013 181    0.002 350
DCP 4     .049      1.064    1.700 351    0.059 311    0.009 314    0.006  90    0.009 277    0.004 125    0.004 202    0.015 195    0.004  15
DCP 5     .074      1.034    1.363 351    0.047 346    0.006 301    0.004 174    0.010 299    0.005 194    0.001  22    0.013 192    0.006  70
DCP 6     .099      0.952    1.163 352    0.050 359    0.017 329    0.003 163    0.015 298    0.010 197    0.004  52    0.017 196    0.009  65
DCP 7     .149      0.785    0.871 352    0.035   1    0.002 353    0.008  47    0.005 200    0.005  31    0.001 338    0.005 212    0.003 191
DCP 8     .200      0.583    0.704 356    0.029 354    0.003 271    0.004 157    0.006 324    0.009 142    0.002 173    0.017 195    0.008 353
DCP 9     .250      0.532    0.614 354    0.027  16    0.006  11    0.006 269    0.004 240    0.002 221    0.006 322    0.006 274    0.004  39
DCP10     .300      0.467    0.508 354    0.023  17    0.003  53    0.004 273    0.003 246    0.003 186    0.007   9    0.006  14    0.006  90
DCP11     .399      0.397    0.417   0    0.018  15    0.004  30    0.004 252    0.007 180    0.008 267    0.003  30    0.012  11    0.001 146
DCP12     .501      0.301    0.316   2    0.012  12    0.007   0    0.003 120    0.003 246    0.005 219    0.003  70    0.010 336    0.003 116
DCP13     .600      0.313    0.227   7    0.005  68    0.002 320    0.019 213    0.014 241    0.016 266    0.005 351    0.020 336    0.008  29
DCP14     .701      0.296    0.155   5    0.001 329    0.005 311    0.004 211    0.002 346    0.005 250    0.008  65    0.009 354    0.005  97
DCP15     .800      0.151    0.091  15    0.003  67    0.003 298    0.003 125    0.008 344    0.005 312    0.001  76    0.006   2    0.004 136
DCP16     .900     -0.069    0.024  38    0.006 240    0.004 300    0.008 143    0.003 316    0.004 202    0.004 334    0.012 134    0.006  69
DCP17     .969     -0.053    0.018 182    0.005 211    0.003 292    0.002 226    0.003 160    0.005 200    0.004  73    0.005  20    0.005  68

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0          23.07        0.088        0.395        5.16          0.0          5.01        12017.3       20

          V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
         133.4         17414.        0.24E 07    -0.027        1.054         10.16       -0.00101      1.082        0.0
        (437.6)       (363.7)
                                                          HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               5.013    5.161   0    0.233   9    0.039 258    0.007 331    0.021 341    0.018 141    0.021 190    0.008 182    0.006 304
CN                  0.612    0.445 357    0.038  15    0.009 284    0.004 117    0.001 308    0.004 215    0.002 281    0.005 281    0.001 351
CM                 -0.007    0.018 314    0.004 239    0.001 105    0.001 291    0.000 261    0.001  44    0.001  98    0.001  95    0.001 182

DCP 1     .010      2.681    3.142 349    0.199 319    0.049 199    0.026 218    0.038 148    0.032  76    0.010   6    0.017 348    0.013 282
DCP 2     .020      2.410    2.806 353    0.342 294    0.174 191    0.081  91    0.047 325    0.039 184    0.026  26    0.042 257    0.046 136
DCP 3     .030      2.001    1.920 351    0.140  19    0.013 247    0.048  76    0.054 335    0.029 260    0.016 178    0.019  37    0.019 305
DCP 4     .049      1.895    1.628 351    0.113  19    0.051 329    0.024 261    0.012 215    0.009 153    0.002  21    0.009 307    0.005 175
DCP 5     .074      1.706    1.305 352    0.098  16    0.031 322    0.007 287    0.007 251    0.004 139    0.003 277    0.008 285    0.003 142
DCP 6     .099      1.528    1.110 353    0.085  18    0.027 318    0.002 116    0.004 274    0.002 176    0.003 241    0.007 312    0.003 115
DCP 7     .149      1.142    0.827 353    0.059  14    0.010 333    0.002 297    0.008 283    0.009 222    0.007 243    0.004 220    0.006 255
DCP 8     .200      0.933    0.680 356    0.049  18    0.016 295    0.010 225    0.003 322    0.004 320    0.004 339    0.005   9    0.002 307
DCP 9     .250      0.827    0.583 356    0.044  19    0.007 316    0.004 179    0.002 248    0.004 194    0.004 165    0.007 190    0.001 327
DCP10     .300      0.716    0.478 357    0.042  18    0.009 250    0.006  73    0.004 238    0.004 207    0.004 352    0.005 268    0.001 318
DCP11     .399      0.598    0.380   2    0.040  25    0.012 278    0.007 157    0.003 117    0.008 239    0.003 110    0.003 263    0.003 250
DCP12     .501      0.448    0.291   4    0.035  19    0.011 292    0.005 102    0.002 175    0.002 151    0.006 267    0.002 331    0.006  95
DCP13     .600      0.411    0.209   8    0.031  26    0.010 337    0.008 102    0.005  22    0.002  79    0.002 263    0.005 276    0.006 333
DCP14     .701      0.354    0.128  18    0.031  45    0.010 294    0.002  36    0.004  98    0.005 242    0.006 311    0.005 285    0.005  49
DCP15     .800      0.179    0.074  27    0.026  55    0.005 246    0.002 123    0.001  40    0.009 224    0.001 192    0.010 266    0.006   7
DCP16     .900     -0.054    0.035  33    0.007 319    0.006 252    0.008 107    0.006 312    0.004 258    0.004 294    0.007 302    0.002 255
DCP17     .969     -0.064    0.010 151    0.007 297    0.006 236    0.004 154    0.003 172    0.006 149    0.002 216    0.006 273    0.003 232
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ      K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0       23.10        0.088        0.394       5.14        0.0          7.48      12017.4       20

               V          Q            RN          CM(MIN)     CN(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
               132.9       17333.       0.24E 07    -0.079       1.257        12.31      -0.00065     0.694        0.0
              (436.1)     (362.0)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               7.484   5.140   0  0.246  14  0.042 277  0.014 264  0.008  20  0.012  46  0.023 208  0.006  67  0.004   8
CN                  0.760   0.330  16  0.146  11  0.066 250  0.035 132  0.018  22  0.006 265  0.001 333  0.007 352  0.004 136
CM                 -0.012   0.014 229  0.019  78  0.019 333  0.012 235  0.006 153  0.002 103  0.002  59  0.004 258  0.002 271

DCP 1     .010      3.341   1.609 358  0.925  51  0.463 339  0.177 276  0.094 292  0.132 250  0.104 190  0.044 182  0.029  98
DCP 2     .020      2.891   1.452   9  0.940  43  0.512 329  0.162 283  0.157 293  0.151 238  0.127 190  0.061 139  0.041  79
DCP 3     .030      2.612   1.211   5  0.640  37  0.317 313  0.204 246  0.139 193  0.108 159  0.107 117  0.061  61  0.068  29
DCP 4     .049      2.244   0.760  10  0.716  48  0.386 318  0.164 223  0.064 144  0.031 164  0.071 116  0.069  19  0.055 323
DCP 5     .074      1.997   0.643  14  0.582  40  0.309 304  0.163 204  0.061 115  0.015 162  0.060  91  0.071 348  0.051 282
DCP 6     .099      1.792   0.602  16  0.490  33  0.273 292  0.155 192  0.057 104  0.017 141  0.058  74  0.073 332  0.050 262
DCP 7     .149      1.410   0.581  15  0.334  13  0.225 268  0.123 165  0.057  81  0.028  59  0.054  34  0.058 296  0.036 227
DCP 8     .200      1.189   0.569  15  0.256   2  0.170 252  0.121 154  0.057  66  0.029  35  0.036 351  0.060 285  0.023 207
DCP 9     .250      1.069   0.524  13  0.213 348  0.155 229  0.102 125  0.047  45  0.025   0  0.041 321  0.026 243  0.032 149
DCP10     .300      0.924   0.445  14  0.180 340  0.135 217  0.092 115  0.054  28  0.024 341  0.031 291  0.026 318  0.027 122
DCP11     .399      0.764   0.355  18  0.126 342  0.095 206  0.066 102  0.032  12  0.018 322  0.021 292  0.010 207  0.021 118
DCP12     .501      0.563   0.267  23  0.099 344  0.068 203  0.055  94  0.033   4  0.014 300  0.015 263  0.011 121  0.019 102
DCP13     .600      0.478   0.194  30  0.073 345  0.047 188  0.039  75  0.025 349  0.009 286  0.008 255  0.012  82  0.014  83
DCP14     .701      0.403   0.118  37  0.052 345  0.052 168  0.045  53  0.024 312  0.009 251  0.014 240  0.021  89  0.006  23
DCP15     .800      0.227   0.096  28  0.042 285  0.055 153  0.039  42  0.025 310  0.011 238  0.008 182  0.019  53  0.005 322
DCP16     .900     -0.013   0.086  10  0.053 259  0.043 138  0.023  42  0.012 325  0.010 232  0.019 137  0.023  36  0.003 213
DCP17     .969     -0.055   0.031   4  0.023 246  0.012 146  0.008  16  0.004  21  0.008 261  0.006 158  0.015  36  0.001 314

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ      K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0       23.13        0.089        0.393       5.11        0.0         10.00      12017.5       20

               V          Q            RN          CM(MIN)     CN(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
               132.6       17242.       0.24E 07    -0.145       1.396        13.93      -0.00086     0.919        0.0
              (434.8)     (360.1)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              10.004   5.113   0  0.235  15  0.021 274  0.024  19  0.069 332  0.071 193  0.041 198  0.012  39  0.014 339
CN                  0.871   0.250  48  0.164  24  0.024 333  0.038 311  0.030 230  0.021 161  0.012 103  0.010  67  0.008   2
CM                 -0.026   0.044 200  0.031 100  0.009  60  0.015  49  0.013 343  0.009 303  0.007 262  0.008 213  0.005 158

DCP 1     .010      3.760   0.297  56  1.044  70  0.217  89  0.372  65  0.151  22  0.134  51  0.094   3  0.028  40  0.044 349
DCP 2     .020      3.223   0.560  71  1.013  65  0.284  92  0.376  59  0.198  41  0.127  30  0.122  16  0.030 348  0.077 359
DCP 3     .030      2.937   0.414  49  0.657  64  0.221  55  0.236  31  0.207 349  0.134 335  0.120 318  0.086 294  0.074 281
DCP 4     .049      2.434   0.351 119  0.787  67  0.140  40  0.186  40  0.143 336  0.042 312  0.078 323  0.070 260  0.048 260
DCP 5     .074      2.144   0.354 110  0.626  60  0.106  33  0.162  26  0.119 316  0.034 291  0.051 298  0.060 237  0.036 227
DCP 6     .099      1.923   0.352  96  0.516  53  0.088  20  0.155  15  0.108 303  0.042 278  0.054 276  0.061 215  0.031 202
DCP 7     .149      1.531   0.378  68  0.405  37  0.089   0  0.131 339  0.110 276  0.057 241  0.051 223  0.053 187  0.035 164
DCP 8     .200      1.313   0.388  56  0.329  31  0.087 348  0.126 326  0.099 263  0.068 231  0.058 195  0.053 167  0.035 143
DCP 9     .250      1.209   0.421  46  0.290  16  0.098 318  0.111 295  0.091 244  0.073 200  0.054 161  0.049 126  0.035 107
DCP10     .300      1.057   0.382  43  0.242   5  0.075 306  0.096 278  0.075 214  0.056 171  0.045 130  0.036  87  0.026  70
DCP11     .399      0.900   0.366  39  0.175 357  0.044 298  0.072 279  0.061 210  0.048 168  0.038 128  0.023  81  0.024  83
DCP12     .501      0.687   0.301  38  0.131 343  0.034 278  0.056 263  0.059 195  0.042 151  0.033 112  0.025  65  0.026  43
DCP13     .600      0.580   0.248  38  0.109 325  0.023 234  0.041 260  C.049 189  0.038 140  0.033  89  0.034  50  0.033   4
DCP14     .701      0.481   0.183  40  0.087 306  0.023 206  0.038 239  0.038 160  0.036 117  0.031  69  0.032  28  0.035 339
DCP15     .800      0.287   0.158  30  0.080 294  0.034 230  0.049 215  0.044 142  0.034  91  0.023  52  0.031   7  0.026 303
DCP16     .900      0.041   0.148   8  0.064 281  0.015 255  0.029 211  0.033 139  0.027  96  0.024  38  0.023   9  0.024 288
DCP17     .969     -0.024   0.071   7  0.027 287  0.013 272  0.019 223  0.010 174  0.012 113  0.011  43  0.023  24  0.013 303
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                   0.0         23.11       0.089       0.393       5.10        0.0         12.47      12017.6      20

                  V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   132.7       17270.      0.24E 07   -0.156       1.420       14.45      -0.00143     1.520       0.0
                  (435.3)     (360.7)
                                                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             12.475    5.096   0   0.239  14   0.042 207   0.016  52   0.039  91   0.081   7   0.012 252   0.030 204   0.007 182
CN                 0.923    0.270  86   0.091  44   0.071  64   0.018 356   0.027  25   0.022 313   0.010 315   0.018 249   0.007 354
CM                -0.039    0.066 198   0.016 130   0.023 158   0.009 117   0.013 129   0.039  93   0.007  85   0.004  54   0.002  74

DCP 1     .010     4.073    0.932 149   0.302  84   0.515 161   0.161 197   0.205 168   0.107 222   0.103 188   0.045 246   0.050 207
DCP 2     .020     3.541    1.036 131   0.247 105   0.485 157   0.214 175   0.272 177   0.155 209   0.126 193   0.093 251   0.057 263
DCP 3     .030     3.123    0.556 124   0.393  93   0.316 129   0.188 136   0.214 136   0.137 134   0.123 151   0.091 158   0.071 164
DCP 4     .049     2.417    1.009 150   0.319  61   0.363 138   0.110  96   0.148 130   0.064  91   0.074 136   0.047 133   0.060 141
DCP 5     .074     2.128    0.847 143   0.267  78   0.305 125   0.082  82   0.134 112   0.051  58   0.058 113   0.026 103   0.055 114
DCP 6     .099     1.913    0.717 134   0.231  72   0.278 115   0.073  75   0.137  99   0.053  60   0.062  88   0.033  84   0.051  95
DCP 7     .149     1.551    0.544 115   0.214  65   0.224  90   0.079  54   0.117  65   0.061  34   0.065  42   0.042  42   0.044  41
DCP 8     .200     1.342    0.453 101   0.213  64   0.176  75   0.086  47   0.101  46   0.069  20   0.052  15   0.036  29   0.040  18
DCP 9     .250     1.248    0.432  87   0.213  51   0.165  52   0.080  12   0.096  20   0.063 351   0.057 344   0.023 322   0.041 352
DCP10     .300     1.112    0.398  77   0.188  41   0.150  36   0.078 352   0.080 357   0.060 332   0.051 328   0.032 307   0.034 316
DCP11     .399     0.960    0.350  64   0.138  30   0.106  22   0.045 328   0.044 354   0.035 333   0.036 335   0.037 319   0.042 328
DCP12     .501     0.740    0.327  55   0.067 341   0.094  29   0.048 277   0.057  22   0.058 283   0.033 351   0.050 251   0.032  13
DCP13     .600     0.645    0.277  45   0.049 335   0.066   7   0.017 288   0.050 338   0.040 291   0.033 286   0.044 255   0.013 265
DCP14     .701     0.538    0.239  39   0.057 309   0.063 351   0.024 291   0.050 312   0.035 276   0.038 253   0.046 218   0.020 213
DCP15     .800     0.348    0.219  29   0.052 322   0.069 336   0.035 293   0.046 281   0.034 254   0.033 218   0.036 216   0.014 187
DCP16     .900     0.101    0.197  13   0.038 328   0.053 329   0.024 299   0.038 272   0.029 242   0.023 218   0.033 207   0.015 178
DCP17     .969     0.003    0.096   7   0.019 355   0.021 309   0.010 345   0.015 288   0.010 255   0.014 237   0.017 227   0.001 170
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                   0.0         23.14       0.089       0.394       5.09        0.0         15.02      12017.7      20

                  V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   132.9       17328.      0.24E 07   -0.145       1.388       14.14      -0.00212     2.259       0.0
                  (436.0)     (361.9)
                                                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             15.022    5.094   0   0.224   5   0.040 232   0.013 269   0.034 293   0.071 150   0.051 189   0.002 237   0.007 320
CN                 0.953    0.278  96   0.052 156   0.032  98   0.044 138   0.012 185   0.023 141   0.015 145   0.005 336   0.010 160
CM                -0.052    0.071 201   0.026 236   0.012 194   0.016 249   0.007 280   0.007 279   0.006 286   0.002 330   0.004 310

DCP 1     .010     3.979    1.363 160   0.656 251   0.037 313   0.152 261   0.136 347   0.093  93   0.023  69   0.069  81   0.046 191
DCP 2     .020     3.576    1.367 152   0.781 262   0.154 310   0.169 275   0.155 351   0.088  70   0.049 115   0.046  83   0.054 197
DCP 3     .030     3.068    0.919 149   0.365 200   0.244 216   0.224 258   0.167 311   0.073 354   0.077  33   0.053  53   0.031 112
DCP 4     .049     2.305    1.085 156   0.389 234   0.153 189   0.225 237   0.120 301   0.055 286   0.066 353   0.072  38   0.026  79
DCP 5     .074     2.059    0.883 149   0.335 226   0.123 177   0.188 220   0.100 282   0.059 252   0.050 312   0.070  11   0.025  14
DCP 6     .099     1.890    0.728 141   0.282 216   0.115 169   0.170 208   0.096 268   0.055 233   0.057 301   0.067   3   0.029  16
DCP 7     .149     1.560    0.578 124   0.203 167   0.118 146   0.149 182   0.082 224   0.062 202   0.043 248   0.056 318   0.020 307
DCP 8     .200     1.365    0.506 115   0.174 163   0.132 138   0.134 165   0.087 203   0.063 200   0.058 213   0.044 317   0.023 263
DCP 9     .250     1.282    0.459 102   0.153 135   0.134 115   0.126 139   0.073 165   0.069 166   0.055 184   0.041 234   0.028 230
DCP10     .300     1.145    0.406  93   0.137 122   0.113 100   0.112 119   0.084 146   0.060 142   0.052 165   0.034 212   0.029 194
DCP11     .399     1.009    0.358  78   0.100 102   0.077  78   0.086 107   0.035 134   0.037 124   0.034 157   0.018 240   0.018 192
DCP12     .501     0.807    0.320  63   0.073  89   0.053  55   0.067  98   0.020 138   0.030 121   0.034 146   0.011 194   0.025 176
DCP13     .600     0.681    0.289  50   0.067  84   0.053  14   0.053  86   0.007 145   0.033 117   0.032 132   0.012 170   0.026 137
DCP14     .701     0.573    0.250  39   0.056  65   0.050 351   0.054  70   0.019 112   0.028  84   0.033  89   0.009  76   0.012 123
DCP15     .800     0.402    0.252  29   0.077  46   0.045 348   0.058  67   0.027  53   0.025  68   0.028  73   0.012  56   0.017  82
DCP16     .900     0.156    0.194  18   0.071  42   0.024  17   0.031  60   0.025  79   0.017  88   0.014  63   0.008  36   0.016 109
DCP17     .969     0.028    0.086  20   0.037  45   0.014  13   0.005 359   0.009 108   0.013 131   0.008  42   0.008  76   0.008 135
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                TUNED HZ      DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0           23.12        0.088         0.394        5.12         0.0          17.51       12017.8       20

                V             Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                 133.0         17371.       0.24E 07     -0.136        1.278        14.01       -0.00291      3.104        0.0
                (436.4)       (362.8)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              17.507    5.116   0    0.223   4    0.044 262    0.010 359    0.021   9    0.036  75    0.018 211    0.011  63    0.004 323
CN                  0.930    0.248  87    0.074 177    0.042 235    0.020 287    0.012 292    0.010 286    0.011 354    0.015  73    0.006 223
CM                 -0.074    0.054 221    0.024 247    0.013 320    0.007  30    0.006  60    0.006  77    0.004 148    0.006 235    0.001  32

DCP 1    .010       3.284    0.755 145    0.382 241    0.240 317    0.176  49    0.095 136    0.050 238    0.042 337    0.028 340    0.033  82
DCP 2    .020       2.896    0.726 136    0.433 229    0.300 317    0.203  53    0.106 122    0.052 201    0.054 328    0.024  37    0.016  85
DCP 3    .030       2.677    0.713 146    0.345 224    0.202 292    0.118   6    0.092  75    0.056 149    0.039 226    0.032 278    0.022   7
DCP 4    .049       1.986    0.534 145    0.380 238    0.197 312    0.101  14    0.045  65    0.029 127    0.023 194    0.021 213    0.016 295
DCP 5    .074       1.825    0.430 131    0.319 228    0.167 295    0.082 359    0.033  52    0.018  98    0.017 168    0.023 209    0.005 213
DCP 6    .099       1.728    0.374 115    0.278 216    0.154 285    0.083 354    0.032  50    0.013  74    0.011 152    0.019 183    0.017 268
DCP 7    .149       1.449    0.359 110    0.251 200    0.144 260    0.066 327    0.033   0    0.023  42    0.013  81    0.026 183    0.024 251
DCP 8    .200       1.286    0.338 108    0.216 199    0.127 251    0.064 303    0.047 346    0.032  48    0.014  75    0.026 161    0.013 234
DCP 9    .250       1.248    0.348 100    0.195 187    0.121 232    0.066 274    0.054 317    0.040  14    0.024  31    0.022  88    0.009 218
DCP10    .300       1.128    0.320  91    0.158 171    0.095 216    0.063 255    0.045 298    0.031 339    0.027  21    0.025  76    0.015 171
DCP11    .399       1.017    0.320  82    0.116 148    0.071 192    0.043 246    0.035 296    0.021 333    0.021  23    0.029  56    0.010 179
DCP12    .501       0.844    0.294  67    0.083 118    0.046 171    0.030 223    0.025 269    0.027 286    0.025  16    0.029  72    0.009 207
DCP13    .600       0.727    0.271  59    0.079  88    0.038 163    0.033 238    0.017 258    0.030 252    0.027 333    0.024  65    0.006 251
DCP14    .701       0.624    0.256  51    0.080  72    0.040 147    0.017 237    0.031 233    0.032 250    0.018 306    0.016  39    0.006 245
DCP15    .800       0.473    0.223  46    0.079  58    0.034 130    0.012 183    0.020 210    0.021 241    0.012 266    0.020  41    0.001 259
DCP16    .900       0.221    0.150  47    0.050  53    0.022 134    0.014 174    0.012 200    0.018 226    0.010 314    0.020  63    0.004 233
DCP17    .969       0.053    0.073  46    0.030  43    0.012 153    0.002 167    0.009 208    0.008 267    0.009 328    0.018  56    0.002 116
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                TUNED HZ      DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0           23.11        0.089         0.394        5.12         0.0          19.93       12017.9       20

                V             Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                 133.0         17352.       0.24E 07     -0.132        1.166        21.38       -0.00286      3.055        0.0
                (436.2)       (362.4)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              19.934    5.125   0    0.231   6    0.045 254    0.010 341    0.016 355    0.026 120    0.035 231    0.014 345    0.009 325
CN                  0.956    0.196  62    0.013 144    0.008 141    0.004 242    0.008 342    0.003 152    0.006 304    0.018   3    0.003  80
CM                 -0.089    0.039 250    0.002 358    0.004 315    0.002   1    0.001 130    0.001 346    0.001 120    0.005 197    0.001 332

DCP 1    .010       1.703    0.075  86    0.016 165    0.011  76    0.003  43    0.004 118    0.002 222    0.005 233    0.011 309    0.006 137
DCP 2    .020       1.675    0.140  46    0.004 188    0.007  92    0.001 208    0.003 356    0.003 333    0.005 267    0.010 306    0.005 101
DCP 3    .030       1.637    0.169  41    0.001 331    0.006  49    0.005 221    0.001 125    0.003 279    0.007 329    0.005 297    0.009  58
DCP 4    .049       2.437    0.328 111    0.049 171    0.036 322    0.035   4    0.027  45    0.012 146    0.010 282    0.011 281    0.002 245
DCP 5    .074       2.381    0.337  90    0.041 110    0.026 307    0.031 316    0.030 330    0.005 124    0.004 186    0.010 295    0.003 181
DCP 6    .099       2.378    0.386  59    0.119  79    0.041 136    0.027 274    0.028 283    0.005  46    0.003 290    0.018 345    0.008  58
DCP 7    .149       1.588    0.241  28    0.041 114    0.027 241    0.022 228    0.036  18    0.015  30    0.027 310    0.012 271    0.018  30
DCP 8    .200       1.188    0.219  41    0.012 288    0.009  93    0.009   4    0.016  45    0.009 131    0.016 281    0.014 352    0.011  84
DCP 9    .250       1.148    0.229  45    0.016 216    0.007 327    0.012  34    0.005  58    0.011 203    0.008 295    0.026 346    0.008  88
DCP10    .300       1.058    0.214  46    0.014 203    0.003 349    0.007 307    0.006 342    0.007 191    0.006 341    0.024 345    0.005  25
DCP11    .399       0.998    0.217  56    0.017 200    0.006 126    0.003 309    0.012 326    0.001 196    0.007   6    0.028  21    0.004 268
DCP12    .501       0.872    0.220  60    0.017 190    0.011 128    0.012 182    0.010 302    0.004 156    0.004 317    0.023  13    0.007  38
DCP13    .600       0.785    0.222  68    0.018 166    0.013 144    0.011 193    0.012 307    0.003 282    0.010 288    0.022   9    0.006  56
DCP14    .701       0.720    0.209  73    0.023 153    0.020 138    0.007 208    0.005 269    0.003 154    0.007 283    0.023   7    0.006 180
DCP15    .800       0.581    0.187  77    0.011 155    0.023 147    0.008 188    0.004  15    0.009 140    0.004 278    0.014   9    0.008 186
DCP16    .900       0.254    0.134  73    0.008  45    0.006 130    0.001 313    0.007  11    0.004 161    0.002 323    0.018  27    0.008  96
DCP17    .969       0.046    0.064  66    0.004  43    0.015 112    0.004 161    0.004 144    0.004 196    0.001 318    0.021  14    0.003 265
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                   TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                     0.0         23.12        0.087        0.401        5.15         0.0          0.03        12015.1        20

                   V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  135.5         35364.        0.47E 07    -0.030        0.600        5.10        -0.00077      0.833        0.0
                 (444.6)       (738.6)                                          HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 0.027    5.152   0    0.241   7    0.044 261    0.007 179    0.009   1    0.027 115    0.025 194    0.036  70    0.036  10
CN                    0.127    0.474 354    0.018 356    0.003   0    0.001 295    0.001 278    0.002 199    0.001  77    0.002  13    0.001 243
CM                   -0.016    0.013 308    0.001 319    0.001 179    0.000  58    0.000 304    0.001 106    0.001 285    0.001 257    0.000  79

DCP 1      .010      -0.739    3.394 348    0.251  34    0.046 123    0.004  76    0.008 120    0.026 154    0.008 265    0.012 301    0.007 222
DCP 2      .020      -0.305    2.402 351    0.094 327    0.029 323    0.011  15    0.004 108    0.023 171    0.008 298    0.007 303    0.007 262
DCP 3      .030      -0.030    2.030 351    0.077 322    0.014 327    0.000  85    0.002 241    0.012 167    0.005 300    0.005 296    0.006 264
DCP 4      .049       0.171    1.663 351    0.064 324    0.011 350    0.002 322    0.003 285    0.008 175    0.003 339    0.007 269    0.003 153
DCP 5      .074       0.321    1.348 351    0.053 335    0.007   3    0.005 328    0.004 273    0.009 165    0.003  80    0.008 316    0.003  75
DCP 6      .099       0.375    1.166 351    0.042 339    0.010 346    0.001  72    0.006 302    0.007 171    0.003 331    0.007 299    0.004  92
DCP 7      .149       0.246    0.861 352    0.034 351    0.002 353    0.006  43    0.011 313    0.007 155    0.003 305    0.004 295    0.002  45
DCP 8      .200       0.212    0.705 355    0.027 351    0.003 320    0.001 133    0.001 261    0.004 156    0.004  14    0.007 330    0.002 234
DCP 9      .250       0.188    0.622 354    0.027   3    0.004   2    0.004 266    0.006 263    0.006 239    0.002 294    0.000 322    0.003 224
DCP10      .300       0.193    0.521 354    0.023   1    0.003 325    0.001 258    0.003 298    0.003 213    0.001 348    0.002  14    0.002 339
DCP11      .399       0.164    0.414 359    0.020 357    0.003  19    0.001 290    0.003 294    0.001 337    0.003  78    0.004  47    0.003  29
DCP12      .501       0.123    0.319   0    0.013   5    0.005  18    0.002  63    0.001 233    0.000  79    0.001 175    0.002  21    0.004 182
DCP13      .600       0.148    0.243   3    0.010  10    0.003  54    0.000 153    0.002 199    0.003 209    0.007 137    0.003  32    0.002 185
DCP14      .701       0.193    0.167   6    0.006  35    0.004 315    0.002 300    0.004 114    0.004 284    0.005  44    0.004  87    0.005 280
DCP15      .800       0.044    0.047   9    0.005  57    0.002  31    0.001 325    0.001 135    0.001 257    0.003 144    0.004 107    0.003 210
DCP16      .900      -0.086    0.024  19    0.005 196    0.005   0    0.007 240    0.003 136    0.004 265    0.002   7    0.003  16    0.005  15
DCP17      .969      -0.041    0.024 163    0.006 166    0.002 284    0.003 153    0.000  96    0.001 165    0.004 117    0.002 101    0.005 245
                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                   TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                     0.0         23.07        0.087        0.399        5.15         0.0          2.50        12015.2        20

                   V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  134.6         35000.        0.47E 07    -0.026        0.845        7.60        -0.00076      0.825        0.0
                 (441.5)       (731.0)                                          HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 2.503    5.154   0    0.245   9    0.034 262    0.003 278    0.020 349    0.016 133    0.023 182    0.013 102    0.006 291
CN                    0.374    0.472 354    0.020   8    0.006 328    0.002  93    0.003 314    0.002 189    0.002  57    0.004  86    0.003 281
CM                   -0.011    0.013 312    0.002 261    0.001 147    0.000 275    0.000 146    0.000 100    0.001 261    0.002 273    0.001  87

DCP 1      .010       1.041    3.157 348    0.123 358    0.029 134    0.012  93    0.023 288    0.014 156    0.006 321    0.004 262    0.003  31
DCP 2      .020       0.928    2.414 351    0.089 358    0.050 336    0.003 336    0.011 293    0.016 177    0.005  80    0.009  31    0.009 272
DCP 3      .030       1.024    2.075 350    0.072 344    0.032 329    0.003 115    0.015 310    0.009 194    0.006  57    0.002 346    0.002  93
DCP 4      .049       1.057    1.728 351    0.059 327    0.017 315    0.001 205    0.009 294    0.007 153    0.005 330    0.009 332    0.004  26
DCP 5      .074       1.035    1.374 351    0.047 339    0.015 338    0.002 140    0.009 294    0.007 166    0.005 292    0.006 312    0.001 277
DCP 6      .099       0.978    1.172 351    0.044 357    0.014 324    0.003  53    0.005 348    0.006 161    0.004 303    0.005 255    0.002 206
DCP 7      .149       0.705    0.870 352    0.032 355    0.004 326    0.002 218    0.004  96    0.008 146    0.002 293    0.005 270    0.003 121
DCP 8      .200       0.584    0.714 355    0.026 356    0.009 330    0.003 188    0.006 321    0.005 183    0.004 307    0.007 338    0.002 344
DCP 9      .250       0.505    0.613 354    0.030   9    0.004 329    0.003  93    0.001 246    0.002  86    0.003  11    0.007  84    0.004 319
DCP10      .300       0.467    0.515 354    0.026  11    0.006 310    0.002  68    0.003 265    0.003 215    0.002  56    0.006  69    0.004 305
DCP11      .399       0.400    0.412 359    0.021  23    0.003 346    0.002  62    0.003 345    0.003 277    0.002  64    0.008 105    0.003 315
DCP12      .501       0.287    0.315   1    0.017  12    0.003 323    0.001 332    0.004 317    0.002 279    0.003  69    0.004  96    0.003 286
DCP13      .600       0.269    0.236   3    0.012  31    0.005 334    0.005  83    0.005 315    0.003 240    0.003 117    0.006 133    0.006 267
DCP14      .701       0.277    0.162   5    0.013  48    0.005 317    0.002 114    0.003 329    0.002 213    0.003 102    0.007 106    0.005 250
DCP15      .900       0.138    0.089  10    0.008  70    0.005 323    0.003  30    0.002   8    0.002  86    0.005  87    0.009  99    0.002 229
DCP16      .900      -0.074    0.024  22    0.006  55    0.008 339    0.006 173    0.003 188    0.003 270    0.007  31    0.008  51    0.006 277
DCP17      .969      -0.050    0.019 170    0.002 275    0.001 187    0.002  30    0.004 330    0.005 111    0.003 130    0.005  77    0.001 345
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                   FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

            TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H         ALPHA.0    TEST POINT  CYCLES ANALYSED
             0.0        23.16       0.088      0.398      5.16       0.0           5.03      12015.3      20

            V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             134.3      34909.     0.47E 07  -0.023      1.056      10.20      -0.00089      0.965       0.0
            (440.5)    (729.1)                                 HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              5.025   5.159   0   0.236   8   0.038 251   0.007 300   0.019 351   0.005 116   0.019 184   0.011  87   0.002 226
CN                 0.610   0.449 356   0.035  17   0.008 276   0.002 156   0.003  21   0.003 284   0.002  69   0.007  49   0.002 202
CM                -0.003   0.017 317   0.004 242   0.001  77   0.000 332   0.001 239   0.001 126   0.001 243   0.002 242   0.001  42

DCP 1      .010    2.851   3.344 349   0.232 298   0.036 195   0.057 228   0.061 148   0.033  65   0.014 344   0.020  13   0.010 311
DCP 2      .020    2.715   2.445 352   0.160 323   0.129 179   0.143  79   0.115 345   0.068 255   0.023 175   0.005   1   0.024 153
DCP 3      .030    2.058   1.980 351   0.131  22   0.039 330   0.009 254   0.003 305   0.007 251   0.008 149   0.017  38   0.007 349
DCP 4      .049    1.928   1.669 351   0.105  15   0.045 328   0.020 243   0.008 222   0.005 200   0.002 268   0.004  54   0.003 100
DCP 5      .074    1.732   1.329 351   0.087  13   0.023 323   0.008 227   0.004 270   0.003 206   0.005 291   0.003  27   0.003 113
DCP 6      .099    1.570   1.118 352   0.076  14   0.017 314   0.005 210   0.001 153   0.003 199   0.003 100   0.004  61   0.005 104
DCP 7      .149    1.146   0.841 353   0.049  12   0.015 309   0.007 202   0.010 316   0.005 268   0.004 250   0.007 354   0.004  71
DCP 8      .200    0.940   0.686 356   0.049  18   0.008 291   0.003  67   0.003   7   0.002 266   0.005 256   0.003 355   0.003 205
DCP 9      .250    0.809   0.584 355   0.043   6   0.006 269   0.004 158   0.002   5   0.000 252   0.005  75   0.007  49   0.004 152
DCP10      .300    0.723   0.484 356   0.039  21   0.009 280   0.001  56   0.002   4   0.001  28   0.005  37   0.009  31   0.003 192
DCP11      .399    0.602   0.382   1   0.035  28   0.008 261   0.001   2   0.001  36   0.004 321   0.006  77   0.008  58   0.003 265
DCP12      .501    0.438   0.295   3   0.027  28   0.007 263   0.001  50   0.005   9   0.006 258   0.003  58   0.006  44   0.005 219
DCP13      .600    0.375   0.211   7   0.026  36   0.009 256   0.003 118   0.005  44   0.002  18   0.007  78   0.007  33   0.007 216
DCP14      .701    0.344   0.132  11   0.030  44   0.010 284   0.001 178   0.004  86   0.009 307   0.003 112   0.011  67   0.001 355
DCP15      .800    0.173   0.073  23   0.022  41   0.008 279   0.004 143   0.005  21   0.005 322   0.001 344   0.012  52   0.004 203
DCP16      .900   -0.067   0.027  33   0.008  45   0.004 232   0.004 222   0.005  51   0.002 162   0.003  85   0.010  82   0.003 215
DCP17      .969   -0.060   0.010 168   0.005 324   0.005 222   0.004  94   0.004 110   0.005 263   0.006  36   0.007  48   0.002  77
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                   FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

            TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H         ALPHA.0    TEST POINT  CYCLES ANALYSED
             0.0        23.13       0.088      0.397      5.15       0.0           7.50      12015.4      20

            V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             133.8      34704.     0.47E 07  -0.040      1.208      11.96      -0.00085      0.914       0.0
            (439.0)    (724.8)                                 HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.503   5.147   0   0.252  11   0.051 295   0.019 257   0.015  29   0.014  95   0.028 242   0.022 157   0.002 281
CN                 0.773   0.334   9   0.119  22   0.043 278   0.017 160   0.002  53   0.001  22   0.002 297   0.008 135   0.004 351
CM                -0.003   0.013 277   0.011  91   0.011 336   0.009 242   0.004 138   0.002 113   0.001  38   0.005 324   0.001 193

DCP 1      .010    3.581   1.750 357   1.053  68   0.783 350   0.405 269   0.104 202   0.045 279   0.087 227   0.046 164   0.023  62
DCP 2      .020    2.890   1.4[illegible]   2   0.729  49   0.413 336   0.281 271   0.189 214   0.106 175   0.082 162   0.081 111   0.069  64
DCP 3      .030    2.754   1.328   0   0.560  46   0.313 329   0.213 256   0.149 194   0.116 140   0.081  85   0.071  32   0.057 353
DCP 4      .049    2.449   1.028   1   0.527  48   0.284 323   0.151 236   0.078 157   0.032 106   0.022 107   0.049  36   0.045 347
DCP 5      .074    2.161   0.841   3   0.419  40   0.225 309   0.129 215   0.067 127   0.024  65   0.018  56   0.046   7   0.036 304
DCP 6      .099    1.947   0.754   5   0.343  31   0.187 294   0.114 198   0.059 108   0.029  51   0.021  27   0.052 341   0.036 271
DCP 7      .149    1.455   0.640   6   0.254  20   0.141 273   0.087 169   0.053  77   0.011 352   0.011  28   0.030 331   0.018 246
DCP 8      .200    1.210   0.551  10   0.193  12   0.116 263   0.073 164   0.034  61   0.018  41   0.026 354   0.034 304   0.023 217
DCP 9      .250    1.061   0.518   7   0.147 350   0.084 230   0.060 123   0.026  38   0.015 353   0.024 313   0.025 217   0.020 139
DCP10      .300    0.935   0.434   8   0.118 349   0.068 217   0.049 105   0.024   1   0.008 302   0.011 301   0.017 179   0.009 112
DCP11      .399    0.769   0.345  13   0.092 355   0.050 218   0.038 102   0.019 351   0.007 316   0.016 278   0.029 166   0.013  81
DCP12      .501    0.556   0.248  19   0.079 358   0.035 208   0.033  88   0.018 328   0.004 282   0.008 255   0.026 151   0.008  52
DCP13      .600    0.441   0.165  28   0.067  11   0.023 210   0.024  79   0.018 315   0.005 217   0.003 235   0.022 148   0.010  12
DCP14      .701    0.379   0.098  50   0.055  18   0.017 190   0.027  57   0.019 289   0.004 243   0.003 116   0.017 132   0.006   7
DCP15      .800    0.203   0.072  43   0.025 348   0.023 148   0.021  43   0.010 279   0.001 256   0.006 189   0.017 125   0.007 333
DCP16      .900   -0.034   0.058  13   0.030 269   0.019 129   0.011  32   0.003 299   0.006 312   0.005 160   0.014  98   0.006 303
DCP17      .969   -0.053   0.022  12   0.019 269   0.003 184   0.005 122   0.002 223   0.006 330   0.009 168   0.008 134   0.005 301
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

               TUNED HZ   DRIVE HZ    K            MACH NO    DEL.ALPHA  DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       23.12       0.088        0.397      5.11       0.0         10.00      12015.5      20

               V          Q            RN          CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                133.6      34641.       0.47E 07   -0.097      1.326      13.89      -0.00110     1.184       0.0
               (438.2)    (723.5)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            10.003   5.112   0   0.248  17   0.020 248   0.034  16   0.044 337   0.042 232   0.016 117   0.023  92   0.009 265
CN                0.897   0.233  36   0.134  35   0.032   1   0.032 304   0.016 213   0.010 177   0.012  65   0.009  77   0.005 342
CM               -0.014   0.032 211   0.026  99   0.007  48   0.012  37   0.010 314   0.003 284   0.005 252   0.004 246   0.002 163

DCP 1     .010    4.007   0.146 323   1.304  81   0.224  86   0.544  72   0.281   5   0.062  50   0.106   3   0.023  58   0.057   4
DCP 2     .020    3.251   0.303  37   0.832  77   0.296  64   0.315  49   0.254   3   0.091 354   0.154   6   0.094 329   0.087 348
DCP 3     .030    3.021   0.233  32   0.802  80   0.362  48   0.284  13   0.169 326   0.074 310   0.091 325   0.083 287   0.071 261
DCP 4     .049    2.756   0.293  43   0.681  67   0.184  22   0.125  16   0.109 323   0.037 261   0.049 338   0.049 280   0.030 245
DCP 5     .074    2.421   0.322  44   0.529  59   0.135  15   0.116   5   0.101 302   0.039 244   0.041 299   0.043 227   0.017 196
DCP 6     .099    2.164   0.350  45   0.450  52   0.106   9   0.110 354   0.107 286   0.045 226   0.025 276   0.033 206   0.014 175
DCP 7     .149    1.663   0.380  38   0.316  40   0.087 358   0.104 320   0.080 256   0.030 210   0.018 232   0.011 188   0.020 218
DCP 8     .200    1.381   0.354  38   0.246  41   0.092   1   0.104 322   0.065 256   0.031 228   0.031 205   0.027 176   0.022 160
DCP 9     .250    1.221   0.380  34   0.203  20   0.065 357   0.092 295   0.074 217   0.036 172   0.030 134   0.031 101   0.022  76
DCP10     .300    1.081   0.348  34   0.175  12   0.059 332   0.087 281   0.066 199   0.024 166   0.026 127   0.027  92   0.015  59
DCP11     .399    0.901   0.312  35   0.128   6   0.038 324   0.066 277   0.050 192   0.029 179   0.040 111   0.029  74   0.012  33
DCP12     .501    0.673   0.260  36   0.100 352   0.023 308   0.054 255   0.046 166   0.017 147   0.030  85   0.024  58   0.016   7
DCP13     .600    0.540   0.209  40   0.075 339   0.013 261   0.044 233   0.041 140   0.013  90   0.025  75   0.018  58   0.013 335
DCP14     .701    0.448   0.147  49   0.065 313   0.021 176   0.031 213   0.036 114   0.009  52   0.019  46   0.014  51   0.013 341
DCP15     .800    0.266   0.128  34   0.061 286   0.019 197   0.031 199   0.029 105   0.011  98   0.024  33   0.008  46   0.008 328
DCP16     .900    0.022   0.123  11   0.053 275   0.019 254   0.027 193   0.020 112   0.010  91   0.014  13   0.006  59   0.011 284
DCP17     .969   -0.035   0.052   7   0.022 287   0.011 288   0.014 199   0.006 102   0.005 109   0.006  77   0.010  96   0.003 324
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

               TUNED HZ   DRIVE HZ    K            MACH NO    DEL.ALPHA  DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       23.14       0.088        0.396      5.05       0.0         12.47      12015.6      20

               V          Q            RN          CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                133.3      34493.       0.47E 07   -0.124      1.390      14.45      -0.00169     1.806       0.0
               (437.3)    (720.4)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            12.471   5.054   0   0.250  18   0.032 228   0.012  85   0.060  95   0.085  20   0.067 233   0.016 258   0.011 213
CN                0.986   0.204  72   0.083  62   0.062  59   0.011  24   0.026 358   0.011 287   0.012 268   0.011 209   0.008 199
CM               -0.028   0.059 203   0.021 120   0.018 152   0.008  94   0.012 118   0.006  51   0.003  84   0.003 106   0.002  26

DCP 1     .010    4.379   1.265 199   0.818 110   0.543 163   0.210 165   0.181 175   0.036 198   0.098 196   0.036 250   0.040 176
DCP 2     .020    3.456   0.700 169   0.695 108   0.338 150   0.321 132   0.186 166   0.118 194   0.153 205   0.074 218   0.073 230
DCP 3     .030    3.072   0.851 164   0.652  96   0.312 146   0.331 113   0.129 111   0.155 119   0.073 132   0.087 145   0.050 135
DCP 4     .049    2.875   0.585 145   0.361  90   0.289 123   0.093  74   0.087 123   0.048  56   0.037 201   0.031 185   0.048 176
DCP 5     .074    2.518   0.465 134   0.300  89   0.255 108   0.082  62   0.091  92   0.048  36   0.028 118   0.016  66   0.030 114
DCP 6     .099    2.288   0.398 117   0.259  84   0.232  97   0.077  49   0.094  77   0.052  25   0.026  90   0.023  67   0.043  75
DCP 7     .149    1.788   0.335  90   0.207  73   0.177  74   0.052  26   0.080  51   0.039 351   0.019  60   0.021 358   0.013  46
DCP 8     .200    1.471   0.295  87   0.189  75   0.134  70   0.048  53   0.070  41   0.031  17   0.028   7   0.014 348   0.015  67
DCP 9     .250    1.314   0.324  73   0.171  59   0.139  47   0.048   9   0.067  21   0.040 356   0.031 330   0.028 330   0.017 327
DCP10     .300    1.180   0.318  64   0.142  48   0.128  36   0.046 355   0.078   3   0.049 317   0.041 309   0.034 291   0.014 278
DCP11     .399    1.001   0.304  56   0.089  38   0.104  34   0.038 329   0.067 355   0.047 302   0.040 284   0.028 289   0.026 254
DCP12     .501    0.770   0.282  49   0.061  11   0.076  22   0.030 314   0.054 330   0.034 274   0.034 273   0.021 280   0.022 239
DCP13     .600    0.623   0.251  45   0.056 329   0.050   4   0.023 279   0.043 314   0.029 243   0.021 265   0.011 264   0.019 216
DCP14     .701    0.522   0.216  43   0.067 300   0.044 339   0.027 262   0.041 295   0.029 206   0.010 238   0.009 296   0.012 182
DCP15     .800    0.337   0.204  28   0.066 290   0.045 321   0.019 232   0.045 280   0.027 196   0.011 223   0.010 273   0.012 166
DCP16     .900    0.071   0.168  15   0.036 327   0.052 321   0.017 268   0.029 268   0.019 196   0.010 171   0.006 269   0.006 125
DCP17     .969   -0.014   0.077  13   0.016 351   0.028 332   0.007 262   0.013 266   0.010 219   0.005 215   0.001   9   0.011 147
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0         23.12        0.088        0.396         5.05         0.0         15.03       12015.7        20

             V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              133.1        34474.       0.47E 07    -0.131        1.339        14.58       -0.00179      1.909        0.0
             (436.6)      (720.0)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA            15.032     5.067   0    0.222   7    0.041 230    0.024 207    0.006 274    0.016 117    0.018 152    0.011 133    0.008 290
CN                1.005     0.226  92    0.053 122    0.021 127    0.016 110    0.016 126    0.005  80    0.009  62    0.006  31    0.002 182
CM               -0.049     0.070 197    0.024 217    0.009 175    0.012 214    0.006 250    0.003 255    0.002 257    0.002 289    0.001 333

DCP 1    .010     3.542     2.280 171    0.709 247    0.085 212    0.202 254    0.131 340    0.083  81    0.032 327    0.055  51    0.038 198
DCP 2    .020     3.009     1.602 163    0.576 222    0.241 221    0.232 269    0.120 353    0.068  54    0.052  57    0.048  82    0.037 175
DCP 3    .030     2.783     1.300 163    0.369 207    0.337 192    0.228 245    0.103 264    0.062 338    0.050  28    0.064  73    0.043 130
DCP 4    .049     2.883     0.721 160    0.266 187    0.160 184    0.138 221    0.090 241    0.045 317    0.041  31    0.048  52    0.045  84
DCP 5    .074     2.542     0.548 147    0.246 184    0.110 163    0.127 201    0.040 222    0.036 258    0.031 353    0.043 356    0.036  32
DCP 6    .099     2.318     0.445 128    0.260 185    0.107 136    0.132 193    0.047 221    0.049 231    0.025 322    0.047 319    0.026   3
DCP 7    .149     1.774     0.474 106    0.148 169    0.086 119    0.087 162    0.036 205    0.023 207    0.009 282    0.032 310    0.003 329
DCP 8    .200     1.434     0.440 112    0.148 144    0.088 122    0.076 153    0.044 184    0.020 235    0.019 257    0.021 307    0.031 317
DCP 9    .250     1.310     0.417 100    0.152 115    0.080 110    0.072 119    0.061 149    0.016 130    0.006 155    0.014 275    0.021 281
DCP10    .300     1.104     0.339  91    0.139 104    0.064 108    0.069  99    0.060 132    0.017 113    0.015 122    0.008 208    0.016 223
DCP11    .399     1.032     0.288  75    0.122  89    0.030  95    0.061  83    0.054 128    0.017  96    0.025 113    0.013 116    0.013 212
DCP12    .501     0.829     0.268  56    0.097  74    0.020  29    0.047  57    0.043 108    0.016  59    0.022  94    0.012  71    0.014 176
DCP13    .600     0.686     0.269  44    0.073  56    0.037 336    0.047  42    0.023  78    0.014  47    0.018  69    0.011  55    0.004 110
DCP14    .701     0.589     0.259  34    0.056  25    0.039 327    0.043  18    0.019  52    0.009  62    0.012  43    0.006 107    0.006 107
DCP15    .800     0.415     0.255  20    0.068  21    0.021 330    0.035  16    0.020  36    0.009  76    0.006  24    0.006 100    0.003 123
DCP16    .900     0.151     0.182  14    0.068  33    0.019  30    0.02[illegible]   7    0.022   6    0.006  71    0.005   3    0.008  57    0.006  67
DCP17    .969     0.015     0.070  17    0.036  33    0.006  79    0.007   1    0.004 116    0.005  85    0.010  53    0.003  88    0.002 197

                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0         23.13        0.089        0.396         5.04         0.0         17.51       12015.8        20

             V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              133.0        34493.       0.47E 07    -0.143        1.270        14.77       -0.00247      2.635        0.0
             (436.5)      (720.4)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA            17.510     5.066   0    0.214   4    0.049 264    0.003 242    0.029  49    0.023  39    0.032 182    0.003 254    0.004 347
CN                0.995     0.210  92    0.031 152    0.022 203    0.013 225    0.010 269    0.007 291    0.001 124    0.007 349    0.007 330
CM               -0.070     0.056 212    0.030 228    0.011 294    0.004 326    0.003  29    0.003  64    0.000 187    0.002 153    0.001 122

DCP 1    .010     2.677     1.267 169    0.558 252    0.260 316    0.181  13    0.128 104    0.063 190    0.030 238    0.006 339    0.009  95
DCP 2    .020     2.443     1.013 162    0.488 246    0.261 310    0.127  18    0.088 117    0.053 169    0.046 234    0.025 330    0.007  70
DCP 3    .030     2.380     0.998 161    0.461 250    0.192 309    0.008 340    0.058  59    0.043 141    0.036 220    0.025 252    0.007 285
DCP 4    .049     2.574     0.604 167    0.308 232    0.116 297    0.034 277    0.039 347    0.028  86    0.007 186    0.016  12    0.016 347
DCP 5    .074     2.344     0.432 154    0.254 212    0.128 277    0.031 291    0.043 322    0.039  46    0.011  91    0.004  16    0.016 247
DCP 6    .099     2.183     0.318 130    0.247 201    0.143 264    0.060 261    0.043 309    0.035   9    0.015 135    0.018  61    0.007 309
DCP 7    .149     1.733     0.355  97    0.207 193    0.090 244    0.034 282    0.025 316    0.010  32    0.009 108    0.008 309    0.016 323
DCP 8    .200     1.388     0.355 114    0.160 189    0.051 229    0.044 260    0.035 325    0.012  16    0.010  96    0.015 224    0.020 305
DCP 9    .250     1.318     0.368 103    0.135 168    0.074 191    0.053 229    0.035 279    0.027 329    0.011  54    0.001  47    0.013 317
DCP10    .300     1.210     0.320  97    0.102 153    0.070 179    0.053 207    0.034 257    0.022 322    0.003  11    0.011  47    0.009  32
DCP11    .399     1.067     0.283  82    0.066 106    0.068 164    0.041 208    0.023 252    0.023 308    0.005  63    0.013  48    0.014  29
DCP12    .501     0.875     0.263  65    0.093  70    0.056 151    0.0[illegible] 201    0.016 223    0.018 275    0.005 340    0.017 356    0.017 358
DCP13    .600     0.730     0.247  53    0.107  54    0.043 135    0.0[illegible] 193    0.009 205    0.016 262    0.005 200    0.017 350    0.010   9
DCP14    .701     0.626     0.236  38    0.106  42    0.029  98    0.008  72    0.005 158    0.012 221    0.004 206    0.007 334    0.005 276
DCP15    .800     0.485     0.209  34    0.095  41    0.026  76    0.015 109    0.010 206    0.012 220    0.002 300    0.013 266    0.009 251
DCP16    .900     0.206     0.135  38    0.071  34    0.019  69    0.018 105    0.005 228    0.009 202    0.005  71    0.002 284    0.010 278
DCP17    .969     0.040     0.060  46    0.028  50    0.011 105    0.010 117    0.005 155    0.004 179    0.004 338    0.007 348    0.005 235
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0        23.14       0.089         0.396       5.00        0.0         19.94       12015.9     20

            V           Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
             132.9       34688.      0.47E 07     -0.160       1.268       19.50      -0.00348     3.711       0.0
            (436.1)     (720.3)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             19.965    5.001   0   0.228   8   0.048 256   0.008 198   0.024  35   0.012  84   0.034 177   0.018 144   0.009 324
CN                 0.999    0.196  85   0.031 118   0.016 113   0.016  83   0.008 137   0.005   1   0.009 119   0.006 131   0.005 296
CM                -0.090    0.048 248   0.010 247   0.006 284   0.004 233   0.002 292   0.002 166   0.002 244   0.001 284   0.001 159

DCP 1    .010      2.123    0.464 157   0.184 265   0.139  43   0.110 136   0.035 247   0.023  77   0.024 185   0.015 308   0.019  42
DCP 2    .020      2.036    0.366 146   0.135 257   0.066  36   0.052 124   0.013 221   0.005  88   0.004 196   0.007  20   0.012   7
DCP 3    .030      2.039    0.331 137   0.185 247   0.082 332   0.053  78   0.011 218   0.007  11   0.016 202   0.018 268   0.006 317
DCP 4    .049      2.379    0.305 170   0.090 142   0.074 274   0.013   8   0.028  83   0.024 230   0.016 181   0.017 153   0.013 188
DCP 5    .074      2.222    0.218 159   0.108 136   0.056 253   0.015 271   0.014  79   0.006 273   0.025 180   0.023 106   0.007 249
DCP 6    .099      2.135    0.101 121   0.122 129   0.079 237   0.025 265   0.007 162   0.017  22   0.011 139   0.018 130   0.006 327
DCP 7    .149      1.673    0.201  68   0.077 145   0.061 132   0.023  22   0.019 206   0.007  60   0.022 179   0.022 176   0.020 282
DCP 8    .200      1.336    0.233  74   0.024 196   0.019 118   0.021 145   0.003  32   0.004 244   0.008 133   0.007 198   0.013 273
DCP 9    .250      1.285    0.265  81   0.036 158   0.029 143   0.019 107   0.002 129   0.007  62   0.018 133   0.009 159   0.003 249
DCP10    .300      1.191    0.259  79   0.039 149   0.025 127   0.019 119   0.006 229   0.000  50   0.012  96   0.005 115   0.006 255
DCP11    .399      1.094    0.265  83   0.039 135   0.035 106   0.037 121   0.016 185   0.003  39   0.012 149   0.006 128   0.010 255
DCP12    .501      0.933    0.256  80   0.035 112   0.028  89   0.036  86   0.018 143   0.003  27   0.010 156   0.008  63   0.005 212
DCP13    .600      0.806    0.243  77   0.045  88   0.031  97   0.032  65   0.025 120   0.009  24   0.014  98   0.006 144   0.005 105
DCP14    .701      0.711    0.225  72   0.050  72   0.022 101   0.027  47   0.020 103   0.008 332   0.016  76   0.008 125   0.010 328
DCP15    .800      0.565    0.195  72   0.051  64   0.025 125   0.015  27   0.008 114   0.010 345   0.014  56   0.010 125   0.013 349
DCP16    .900      0.243    0.133  70   0.031  55   0.013  96   0.007 317   0.005 346   0.011 332   0.009  41   0.004 103   0.004 354
DCP17    .969      0.056    0.062  78   0.012  77   0.007  75   0.005 301   0.003  30   0.002 345   0.005 317   0.005  18   0.004 295

                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0        23.06       0.086         0.403       5.15        0.0         0.33        12019.1     20

            V.          Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
             136.4       48220.      0.64E 07     -0.029       0.595       5.13       -0.00069     0.756       0.0
            (447.5)     (1007.1)                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.003    5.151   0   0.235   8   0.035 264   0.009 195   0.013  20   0.011  68   0.012 216   0.003 227   0.003 255
CN                 0.121    0.478 354   0.016 358   0.002  16   0.003  65   0.001   6   0.001 295   0.002   7   0.001 254   0.001  91
CM                -0.015    0.011 308   0.001 335   0.000 138   0.000 257   0.001 176   0.000 138   0.001 214   0.000 144   0.000 226

DCP 1    .010     -0.756    3.446 348   0.287  36   0.079 123   0.013 168   0.011 142   0.013 190   0.028 266   0.002  37   0.008  79
DCP 2    .020     -0.337    2.438 350   0.094 337   0.020 331   0.012  35   0.009 132   0.007 181   0.005 316   0.004 192   0.003  55
DCP 3    .030     -0.046    2.345 350   0.079 325   0.010 340   0.031 327   0.032 187   0.035 187   0.004 289   0.003 154   0.003  89
DCP 4    .049      0.170    1.676 351   0.062 325   0.005 350   0.003 304   0.002 231   0.002 227   0.023 344   0.006 136   0.003 186
DCP 5    .074      0.327    1.345 351   0.049 338   0.007  22   0.001 292   0.001 241   0.002 238   0.002  36   0.001  59   0.003 128
DCP 6    .099      0.364    1.163 351   0.040 339   0.009 349   0.006 247   0.005 187   0.004  14   0.036 316   0.007 189   0.004 138
DCP 7    .149      0.247    0.869 352   0.033 341   0.002   7   0.003 338   0.001 165   0.003  23   0.031 113   0.002  42   0.001 256
DCP 8    .200      0.200    0.712 355   0.029 355   0.003 356   0.001 186   0.001 252   0.002 107   0.022 126   0.007 199   0.001 194
DCP 9    .250      0.180    0.621 353   0.019   1   0.004 291   0.002 248   0.003 339   0.002 264   0.024 267   0.004 348   0.003  42
DCP10    .300      0.187    0.521 354   0.019   1   0.005   5   0.002 200   0.004 333   0.002 213   0.001  12   0.001  73   0.001  79
DCP11    .399      0.169    0.420 356   0.015  18   0.005   1   0.002 273   0.004  44   0.002 315   0.001 236   0.002 229   0.004  73
DCP12    .501      0.117    0.318   0   0.010   1   0.003  56   0.002  63   0.001 348   0.003 310   0.002  25   0.002 241   0.004 125
DCP13    .600      0.137    0.245   2   0.007 349   0.002  68   0.004  55   0.005  58   0.001 338   0.002  47   0.002 342   0.002 117
DCP14    .701      0.193    0.173   3   0.006  69   0.002  30   0.003 133   0.002 324   0.002 285   0.024  26   0.002 288   0.002   5
DCP15    .800      0.090    0.101   7   0.003 114   0.000 308   0.001  70   0.003 286   0.001 330   0.005 344   0.003  77   0.002 310
DCP16    .900     -0.086    0.031  10   0.003 211   0.003 336   0.002   8   0.002  30   0.001  93   0.023 115   0.003 359   0.002  44
DCP17    .969     -0.042    0.021 180   0.003 165   0.005 204   0.002 113   0.002 322   0.001 190   0.026  36   0.005 265   0.001 167
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                 FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

          TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0        23.06      0.087       0.400      5.16       0.0         2.49     12019.2       20

          V          Q          RN          CM(MIN)    CN(MAX)    ALPHA.MAX  AERO DAMP   TDR         EXT DAMP
           135.2      47622.      0.64E 07  -0.022       0.839      7.53     -0.03376     3.792       0.0
          (443.5)    (994.6)                                HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             2.455    5.199   0   0.207  11   0.041 268   0.001  31   0.023   1   0.017 111   0.011 225   0.005 142   0.007 285
CN                0.363    0.477 354   0.010   8   0.002 346   0.001  51   0.002 296   0.002 184   0.000 356   0.000  71   0.001 157
CM               -0.010    0.012 307   0.001 280   0.000  10   0.000 223   0.000 169   0.000 211   0.000 345   0.001 196   0.003 349

DCP 1    .010     1.043    3.170 348   0.126 355   0.039 135   0.015  93   0.021 287   0.011 181   0.008 346   0.011 177   0.005 359
DCP 2    .020     0.925    2.465 350   0.090 351   0.009 348   0.036  78   0.018 306   0.035 216   0.023  23   0.018 186   0.004  83
DCP 3    .030     1.010    2.080 350   0.075 349   0.021 328   0.005  44   0.013 297   0.029 203   0.026 342   0.011 207   0.006  73
DCP 4    .049     1.053    1.727 350   0.060 331   0.012 330   0.005 248   0.004 300   0.008 190   0.005 336   0.009 196   0.002 101
DCP 5    .074     1.039    1.370 351   0.049 343   0.009 336   0.004 198   0.004 209   0.035 163   0.035 346   0.003 212   0.002 318
DCP 6    .099     0.967    1.176 351   0.043 357   0.015 333   0.001  92   0.004 262   0.006 148   0.032   4   0.005 211   0.003 289
DCP 7    .149     0.702    0.875 352   0.032 356   0.005 337   0.002 133   0.006 266   0.008 158   0.025 345   0.005 153   0.002 249
DCP 8    .200     0.566    0.717 354   0.033  11   0.005   2   0.031 245   0.004 278   0.001   7   0.022 256   0.006 213   0.001 284
DCP 9    .250     0.480    0.620 353   0.027  17   0.002  48   0.004  20   0.002 343   0.004 282   0.023 357   0.002 218   0.003  37
DCP10    .300     0.442    0.516 354   0.021  16   0.004  18   0.002  55   0.002 298   0.032 211   0.022  36   0.002   7   0.005 129
DCP11    .399     0.374    0.415 359   0.018  30   0.002  13   0.001  89   0.002 256   0.003 228   0.031 116   0.002  79   0.004 183
DCP12    .501     0.273    0.315   0   0.015  35   0.004 326   0.001 355   0.001 325   0.001  52   0.021 276   0.002  32   0.005 179
DCP13    .600     0.256    0.243   2   0.011  38   0.002 230   0.002   4   0.003 333   0.001  37   0.002  36   0.004 354   0.001 138
DCP14    .701     0.275    0.165   4   0.013  36   0.002  21   0.002  45   0.002  18   0.001 199   0.023 176   0.002 342   0.003  90
DCP15    .800     0.135    0.097   8   0.004  60   0.003 148   0.003 111   0.004 330   0.002 282   0.001  16   0.005  29   0.002  97
DCP16    .900    -0.074    0.036  16   0.001 327   0.003 289   0.033 281   0.001 157   0.004 141   0.036 165   0.002  25   0.003 266
DCP17    .969    -0.047    0.016 176   0.008 251   0.002  66   0.007  63   0.003 278   0.003  28   0.001  96   0.002 205   0.001 209
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                 FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

          TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
            0.0        23.11      0.088       0.398      5.16       0.0         4.98     12019.3       20

          V          Q          RN          CM(MIN)    CN(MAX)    ALPHA.MAX  AERO DAMP   TDR         EXT DAMP
           134.2      47105.      0.64E 07  -0.022       1.059     10.14     -0.00009     0.956       0.0
          (440.4)    (983.8)                                HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             4.976    5.162   0   0.239   9   0.039 235   0.013 333   0.013  21   0.003 241   0.007 240   0.009 301   0.003  81
CN                0.612    0.456 355   0.034  19   0.007 288   0.002 166   0.002  96   0.001 287   0.001   2   0.006 295   0.002  57
CM               -0.004    0.016 315   0.004 243   0.001  87   0.001 336   0.001 268   0.000 144   0.000 172   0.002 147   0.001 286

DCP 1    .010     2.914    3.464 349   0.280 287   0.061 176   0.061 233   0.087 145   0.055  55   0.026 332   0.008 211   0.028 312
DCP 2    .020     2.203    2.431 351   0.133 344   0.059 194   0.087  83   0.091 347   0.086 253   0.049 166   0.018 134   0.012  51
DCP 3    .030     2.063    2.009 351   0.126  21   0.039 327   0.016 257   0.012 155   0.001  23   0.001 137   0.005 220   0.009 353
DCP 4    .049     1.940    1.684 351   0.099  14   0.048 325   0.014 248   0.007 187   0.004  88   0.004  38   0.012 218   0.003  36
DCP 5    .074     1.749    1.330 351   0.078  11   0.028 315   0.004 256   0.003 233   0.004 175   0.004 297   0.012 213   0.001  46
DCP 6    .099     1.567    1.129 352   0.073  17   0.017 313   0.004 211   0.006 207   0.001 118   0.001   8   0.011 214   0.005  47
DCP 7    .149     1.153    0.865 353   0.056  11   0.012 286   0.002  35   0.003 331   0.000 352   0.001 121   0.012 198   0.006  20
DCP 8    .200     0.934    0.691 356   0.065  20   0.008 287   0.001  44   0.003 341   0.002 317   0.002 297   0.012 191   0.003  77
DCP 9    .250     0.811    0.592 355   0.044  14   0.003 237   0.002  82   0.001   3   0.005 229   0.002  95   0.006 309   0.004  58
DCP10    .300     0.719    0.492 355   0.039  22   0.004 290   0.004 116   0.004  98   0.003 287   0.001  52   0.009 305   0.005  28
DCP11    .399     0.592    0.389   1   0.038  33   0.004 286   0.005 146   0.006 122   0.001 254   0.003  69   0.011 305   0.005  91
DCP12    .501     0.437    0.298   2   0.025  31   0.006 305   0.003 171   0.001 170   0.003 279   0.001 290   0.010 318   0.001 116
DCP13    .600     0.376    0.218   5   0.027  38   0.005 296   0.002 194   0.004  78   0.002 106   0.002 253   0.008 317   0.001  51
DCP14    .701     0.356    0.141  10   0.024  42   0.008 280   0.004 189   0.002 113   0.003 340   0.000 235   0.005 343   0.002  88
DCP15    .800     0.180    0.078  19   0.023  49   0.008 277   0.004 170   0.006  69   0.000 164   0.002  31   0.010 316   0.001 177
DCP16    .900    -0.058    0.027  27   0.011  38   0.003 235   0.003 117   0.001 183   0.002 307   0.007   1   0.009 325   0.007  82
DCP17    .969    -0.060    0.012 157   0.005 336   0.002 165   0.000 132   0.006  92   0.001 359   0.002 228   0.008 318   0.003 270
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       23.15      0.088      0.396      5.16       0.0        7.48      12019.4      20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                134.0      47009.     0.64E 07  -0.019      1.211      12.16     -0.00106    1.144       0.0
               (439.6)    (981.8)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              7.478   5.161   0  0.234  14  0.029 293  0.023 264  0.020  54  0.009  88  0.017 306  0.001 187  0.005 185
CN                 0.780   0.336   8  0.113  24  0.042 274  0.016 152  0.004   8  0.002 104  0.005  22  0.005  61  0.001 196
CM                 0.001   0.018 307  0.005 129  0.008 353  0.007 245  0.004 137  0.002  40  0.000 271  0.002 265  0.001 247

DCP 1     .010     3.830   2.150 349  0.841  72  0.728 357  0.414 277  0.127 211  0.033 287  0.097 249  0.094 167  0.047  82
DCP 2     .020     3.081   1.739 358  0.527  42  0.272 336  0.215 280  0.200 212  0.119 135  0.018 110  0.082 127  0.082  67
DCP 3     .030     2.903   1.609 359  0.421  28  0.214 302  0.139 227  0.096 168  0.082 111  0.063  46  0.045   3  0.035 302
DCP 4     .049     2.586   1.261 359  0.372  36  0.168 307  0.087 220  0.053 144  0.038  80  0.027  31  0.020  15  0.025 309
DCP 5     .074     2.263   1.008   0  0.295  26  0.143 292  0.078 194  0.054 112  0.031  45  0.022   1  0.021 344  0.031 269
DCP 6     .099     1.994   0.833   1  0.265  29  0.124 289  0.074 189  0.050 101  0.034  23  0.019 325  0.029 308  0.015 251
DCP 7     .149     1.476   0.636   3  0.205  25  0.100 279  0.059 176  0.032  83  0.019 352  0.002 321  0.007  36  0.012 243
DCP 8     .200     1.204   0.542   7  0.165  18  0.084 267  0.051 161  0.027  65  0.008 342  0.011  50  0.011 334  0.018 239
DCP 9     .250     1.045   0.477   7  0.144   8  0.074 246  0.049 128  0.028  18  0.007 257  0.009  22  0.010 317  0.020 190
DCP10     .300     0.911   0.386   9  0.126  10  0.059 245  0.039 120  0.024   8  0.008 269  0.006 354  0.006 312  0.010 176
DCP11     .399     0.740   0.299  16  0.110  17  0.050 245  0.034 118  0.021 358  0.015 241  0.006  85  0.006  45  0.007 168
DCP12     .501     0.540   0.220  21  0.089  17  0.038 246  0.025 108  0.015 324  0.010 225  0.007  18  0.000 211  0.008 110
DCP13     .600     0.436   0.152  31  0.078  22  0.030 244  0.024  94  0.017 314  0.010 211  0.003 356  0.006 125  0.006  75
DCP14     .701     0.383   0.088  57  0.068  29  0.020 231  0.023  69  0.019 306  0.011 184  0.004  72  0.008 117  0.007  41
DCP15     .800     0.202   0.062  56  0.032  11  0.019 178  0.022  49  0.017 284  0.007 173  0.004  15  0.008  79  0.004  32
DCP16     .900    -0.032   0.053  25  0.026 275  0.025 165  0.012  17  0.004 196  0.005  18  0.004 141  0.012  62  0.002 340
DCP17     .969    -0.052   0.013  13  0.019 276  0.014 166  0.001  46  0.003  71  0.001 182  0.001 196  0.015  82  0.003 341
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0       23.08      0.088      0.396      5.11       0.0        9.96      12019.5      20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                133.4      46750.     0.63E 07  -0.080      1.307      13.56     -0.00127    1.358       0.0
               (437.6)    (976.4)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              9.956   5.111   0  0.240  20  0.015 287  0.036   4  0.046 316  0.038 183  0.009 144  0.003 120  0.005 279
CN                 0.902   0.231  37  0.135  32  0.020   6  0.031 314  0.017 209  0.009 154  0.011  53  0.004  10  0.001 235
CM                -0.008   0.025 228  0.025 103  0.009  22  0.007  35  0.009 319  0.004 262  0.004 218  0.001 174  0.001 140

DCP 1     .010     4.416   0.680 333  1.319  90  0.419  42  0.264  74  0.220  36  0.047  28  0.103  65  0.118  21  0.023 320
DCP 2     .020     3.567   0.669  11  0.735  76  0.335  50  0.190  13  0.136  14  0.105 326  0.072   0  0.102 334  0.059 291
DCP 3     .030     3.231   0.522  11  0.697  80  0.396  47  0.329   3  0.222 313  0.137 265  0.059 255  0.040 295  0.055 238
DCP 4     .049     2.919   0.499  30  0.645  58  0.211   2  0.106 323  0.066 290  0.050 238  0.004 280  0.031 303  0.050 226
DCP 5     .074     2.492   0.398  38  0.526  53  0.150 358  0.088 336  0.079 295  0.058 239  0.014 246  0.032 248  0.052 188
DCP 6     .099     2.176   0.349  43  0.432  50  0.095 359  0.084 347  0.078 286  0.046 222  0.017 230  0.030 201  0.041 143
DCP 7     .149     1.648   0.344  41  0.318  38  0.060 346  0.073 334  0.066 260  0.037 188  0.001 229  0.021 183  0.030 110
DCP 8     .200     1.350   0.337  39  0.240  35  0.040 351  0.068 332  0.057 249  0.030 177  0.006 104  0.011 140  0.019  82
DCP 9     .250     1.211   0.367  35  0.197  21  0.037 336  0.068 306  0.060 219  0.030 154  0.014 115  0.021 107  0.019  44
DCP10     .300     1.061   0.318  36  0.167  11  0.027 309  0.052 294  0.048 201  0.023 137  0.011 102  0.015  81  0.007  14
DCP11     .399     0.873   0.287  40  0.134   5  0.017 279  0.042 292  0.041 197  0.020 147  0.020 101  0.018  65  0.009   9
DCP12     .501     0.661   0.244  40  0.107 354  0.013 241  0.035 276  0.041 177  0.019 114  0.022  65  0.014  31  0.010 333
DCP13     .600     0.522   0.187  49  0.082 343  0.021 189  0.023 271  0.033 148  0.015  82  0.020  55  0.014 354  0.007 277
DCP14     .701     0.441   0.137  62  0.065 326  0.030 167  0.016 248  0.034 133  0.015  63  0.017  43  0.010 341  0.005 310
DCP15     .800     0.258   0.115  45  0.062 299  0.023 185  0.019 207  0.028 118  0.013  67  0.020  24  0.009 295  0.005 269
DCP16     .900     0.015   0.109  15  0.054 278  0.017 218  0.025 199  0.018 112  0.010  76  0.017 355  0.004 242  0.005 295
DCP17     .969    -0.036   0.053   8  0.032 281  0.010 263  0.011 201  0.007 110  0.009 100  0.010  20  0.006 271  0.005 204
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0         22.92       0.085       0.408       5.05        0.0        12.46       12021.1      20

              V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX AERO DAMP   TOR         EXT DAMP
               137.7       49125.      0.65E 07   -0.110       1.337       14.49     -0.00163     1.802       0.0
              (451.9)     (1026.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            12.462   5.047   0   0.230  19   0.039 166   0.029  54   0.028 102   0.068   7   0.041 307   0.043 218   0.023 216
CN                0.961   0.202  75   0.076  49   0.047  74   0.016  38   0.024 357   0.011 294   0.007 280   0.012 225   0.010 227
CM               -0.024   0.051 207   0.022 112   0.011 153   0.008 101   0.008 120   0.006  67   0.003  36   0.005  20   0.003  29

DCP 1   .010      4.591   0.932 194   0.718 106   0.461 175   0.247 165   0.146 207   0.132 187   0.033 232   0.067 220   0.033 169
DCP 2   .020      3.640   0.430 147   0.526 105   0.241 142   0.275 140   0.140 162   0.144 165   0.105 201   0.112 213   0.088 212
DCP 3   .030      3.172   0.662 168   0.731 107   0.309 101   0.218 118   0.198 103   0.119  88   0.065 108   0.065 116   0.035 106
DCP 4   .049      2.871   0.575 143   0.531  83   0.182 101   0.159  88   0.090  62   0.057  66   0.050  55   0.018  11   0.013 138
DCP 5   .074      2.4[illegible]   0.520 132   0.398  71   0.151 107   0.135  69   0.053  46   0.049  62   0.046  42   0.025  25   0.019  45
DCP 6   .099      2.178   0.463 124   0.292  63   0.142 117   0.114  68   0.059  60   0.056  38   0.034  17   0.025 354   0.004 319
DCP 7   .149      1.701   0.373  97   0.195  50   0.125  96   0.071  37   0.044  47   0.044   5   0.027 346   0.023 317   0.004 311
DCP 8   .200      1.437   0.315  84   0.140  56   0.120  86   0.065  38   0.051  31   0.041 357   0.026 342   0.020 320   0.015 281
DCP 9   .250      1.365   0.296  70   0.127  50   0.104  67   0.047  24   0.055  23   0.048 338   0.024 312   0.013 320   0.015 284
DCP10   .300      1.144   0.291  62   0.104  36   0.087  47   0.043 353   0.047 353   0.038 313   0.028 291   0.017 257   0.017 246
DCP11   .399      0.959   0.297  56   0.072   8   0.062  50   0.034 342   0.043 353   0.032 289   0.016 269   0.019 242   0.018 276
DCP12   .501      0.746   0.267  51   0.058 339   0.048  47   0.021 330   0.048 336   0.028 268   0.015 277   0.023 231   0.024 238
DCP13   .600      0.608   0.231  53   0.061 319   0.037  30   0.023 278   0.037 326   0.028 246   0.015 229   0.021 210   0.017 207
DCP14   .701      0.497   0.190  55   0.067 298   0.027 354   0.031 253   0.033 300   0.023 226   0.014 222   0.021 188   0.014 201
DCP15   .800      0.316   0.174  34   0.059 302   0.037 325   0.024 257   0.029 282   0.017 233   0.017 198   0.016 181   0.008 182
DCP16   .900      0.061   0.155  17   0.037 314   0.031 310   0.012 287   0.019 265   0.017 [illegible]   0.013 164   0.025 198   0.011 177
DCP17   .969     -0.012   0.075  11   0.016 316   0.019 329   0.008 342   0.010 301   0.010 [illegible]   0.003 177   0.016 196   0.003 163
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0         23.01       0.086       0.404       5.01        0.0        15.02       12021.2      20

              V           Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX AERO DAMP   TOR         EXT DAMP
               136.2       48321.      0.64E 07   -0.120       1.295       14.56     -0.00178     1.947       0.0
              (447.0)     (1009.2)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.025   5.012   0   0.211   9   0.037 195   0.023 178   0.031 274   0.039 141   0.037 321   0.008 209   0.013 332
CN                0.972   0.242  94   0.042 131   0.014 118   0.025  96   0.012 177   0.015  92   0.014 343   0.004 222   0.002  42
CM               -0.042   0.072 198   0.011 202   0.011 173   0.012 213   0.003 257   0.005 229   0.003 157   0.002   0   0.001  71

DCP 1   .010      4.534   1.693 186   0.159 231   0.173 250   0.164 298   0.055   4   0.051  38   0.068  60   0.026  49   0.033 125
DCP 2   .020      3.639   1.111 165   0.323 167   0.249 244   0.146 283   0.111 358   0.081  65   0.078  41   0.025  71   0.033 111
DCP 3   .030      3.109   1.113 175   0.365 161   0.453 212   0.239 197   0.193 267   0.087 239   0.094 337   0.033 298   0.030  40
DCP 4   .049      2.632   1.151 155   0.232 138   0.238 158   0.115 176   0.045 193   0.035 231   0.015  50   0.031  12   0.026  69
DCP 5   .074      2.226   0.977 145   0.121 167   0.222 146   0.093 192   0.067 194   0.051 215   0.028 295   0.032 304   0.021   9
DCP 6   .099      2.002   0.819 136   0.112 188   0.170 134   0.089 188   0.042 184   0.033 180   0.035 317   0.030 309   0.025 351
DCP 7   .149      1.616   0.554 119   0.093 178   0.101 117   0.060 158   0.035 216   0.026 125   0.012 289   0.015 326   0.008  68
DCP 8   .200      1.417   0.420 107   0.096 158   0.065 120   0.070 138   0.045 208   0.029 111   0.012 244   0.007 339   0.010  86
DCP 9   .250      1.280   0.392  92   0.110 141   0.035  83   0.083 124   0.036 186   0.036 124   0.006 243   0.010 177   0.006 295
DCP10   .300      1.157   0.352  81   0.091 121   0.037  46   0.068 104   0.024 157   0.040  98   0.012   4   0.005 160   0.007 244
DCP11   .399      1.011   0.332  66   0.067  95   0.032  21   0.055  84   0.024 141   0.029  96   0.016  17   0.023 199   0.005 169
DCP12   .501      0.815   0.295  57   0.039  89   0.024   1   0.057  61   0.015 131   0.021  63   0.020   9   0.013 173   0.007   0
DCP13   .600      0.667   0.267  45   0.017  58   0.029 344   0.045  50   0.011 117   0.018  83   0.021 346   0.019 173   0.006 140
DCP14   .701      0.545   0.234  39   0.015 338   0.038 345   0.046  24   0.005  89   0.017  50   0.021 344   0.003 140   0.002 274
DCP15   .800      0.373   0.228  26   0.028  11   0.031 345   0.037  20   0.009  68   0.020  34   0.017 321   0.004 287   0.002   2
DCP16   .900      0.121   0.177  15   0.056  32   0.021   2   0.027   2   0.012  43   0.014  33   0.004 300   0.006 331   0.005 287
DCP17   .969      0.016   0.079  17   0.034  44   0.006  23   0.014  37   0.006 356   0.007  39   0.003 279   0.004 182   0.002 164
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                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.0       TEST POINT    CYCLES ANALYSED
                0.0          22.88         0.086         0.402         5.01          0.0           17.51        12021.3        20

              V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TOR           EXT DAMP
               135.3         47808.        0.64E 07     -0.134         1.258         15.24        -0.00227       2.470         0.0
              (444.0)       (998.5)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C         RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                  17.514      5.007   0     0.200   3     0.044 244     0.023 346     0.018 346     0.021  93     0.035 322     0.002 153     0.015 321
CN                      0.953      0.231  90     0.042 118     0.034 181     0.013 263     0.006 252     0.009 249     0.036 344     0.007 202     0.007 341
CM                     -0.062      0.065 204     0.023 228     0.009 271     0.007 327     0.004   0     0.003 358     0.001  96     0.002   7     0.002 154

DCP 1       .010        3.895      1.657 187     0.332 279     0.180   8     0.085  14     0.064  47     0.019  90     0.011 257     0.014 118     0.008 162
DCP 2       .020        3.263      1.214 173     0.201 246     0.167 306     0.142   7     0.089  79     0.051 160     0.033 210     0.028 227     0.012 231
DCP 3       .030        2.785      1.237 173     0.334 269     0.317 246     0.272 320     0.042  20     0.056  29     0.058 134     0.007  21     0.020 141
DCP 4       .049        2.347      1.011 153     0.285 205     0.176 216     0.064 289     0.025 355     0.021 295     0.010  11     0.030 236     0.017 298
DCP 5       .074        1.982      0.800 137     0.283 205     0.115 223     0.073 288     0.042 334     0.046 321     0.030  13     0.013 190     0.007 284
DCP 6       .099        1.787      0.637 126     0.262 195     0.110 234     0.054 310     0.030 323     0.043 318     0.032   6     0.016 117     0.007  45
DCP 7       .149        1.495      0.435 105     0.162 174     0.093 223     0.057 303     0.019 341     0.019 302     0.011   1     0.003 288     0.003 279
DCP 8       .200        1.345      0.349  96     0.133 158     0.099 214     0.059 281     0.026 308     0.020 302     0.010 341     0.010 186     0.008 245
DCP 9       .250        1.264      0.344  85     0.117 135     0.085 184     0.036 264     0.028 268     0.027 245     0.017 300     0.012 267     0.009 332
DCP10       .300        1.159      0.322  77     0.109 111     0.089 165     0.025 243     0.016 263     0.021 272     0.017 345     0.010 325     0.009  12
DCP11       .399        1.028      0.310  67     0.105  84     0.068 146     0.021 235     0.013 258     0.021 261     0.005 350     0.002 232     0.016  27
DCP12       .501        0.843      0.274  56     0.091  69     0.051 137     0.027 189     0.024 229     0.017 214     0.005 339     0.011 216     0.009  19
DCP13       .600        0.700      0.269  46     0.083  54     0.033 111     0.023 168     0.016 197     0.014 182     0.006 357     0.011 191     0.008   1
DCP14       .701        0.592      0.248  38     0.079  48     0.023  80     0.022 143     0.012 163     0.013 187     0.005 349     0.014 205     0.018 313
DCP15       .800        0.443      0.228  32     0.070  49     0.022  69     0.026 126     0.013 143     0.013 149     0.006 261     0.007 185     0.013 310
DCP16       .900        0.186      0.140  35     0.053  36     0.017  75     0.011 144     0.014 153     0.010 166     0.004 194     0.012 159     0.005 334
DCP17       .969        0.044      0.051  48     0.019  24     0.010 107     0.036 122     0.004 142     0.001  14     0.004 148     0.008 176     0.001 336

                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.0       TEST POINT    CYCLES ANALYSED
                0.0          22.80         0.086         0.401         4.81          0.0           19.93        12021.4        20

              V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TOR           EXT DAMP
               135.0         47737.        0.64E 07     -0.130         1.137         19.91        -0.00250       2.734         0.0
              (443.0)       (997.0)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C         RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                  19.931      4.814   0     0.135 358     0.034 283     0.007 149     0.028 339     0.017 122     0.010 341     0.029  56     0.011 268
CN                      0.939      0.167  89     0.016  53     0.021 132     0.008 232     0.001 240     0.003 149     0.001  56     0.011  24     0.004 127
CM                     -0.077      0.044 222     0.011 223     0.004 301     0.032  23     0.001  65     0.031 278     0.001 175     0.005 206     0.001 306

DCP 1       .010        3.162      1.223 187     0.162   8     0.112 319     0.092  62     0.044 108     0.040 221     0.036 176     0.019 271     0.044 115
DCP 2       .020        2.744      0.923 171     0.144 324     0.009 326     0.059  33     0.030 147     0.028 249     0.043 283     0.016 123     0.012 246
DCP 3       .030        2.353      0.883 164     0.360 269     0.099  55     0.048 257     0.087  35     0.033 146     0.038 333     0.028  90     0.017 283
DCP 4       .049        2.055      0.506 154     0.147 247     0.052 174     0.036 273     0.021 145     0.005 317     0.023 156     0.027 317     0.017  66
DCP 5       .074        1.820      0.338 133     0.114 207     0.047 182     0.033 268     0.013 165     0.007  40     0.024 136     0.018 302     0.023  59
DCP 6       .099        1.716      0.275 114     0.070 180     0.042 151     0.012 288     0.015 113     0.005  32     0.031 115     0.011 271     0.015  35
DCP 7       .149        1.504      0.240  88     0.062 131     0.025 122     0.019 338     0.015  83     0.002  53     0.017 113     0.003 189     0.005  11
DCP 8       .200        1.377      0.234  88     0.037 107     0.006  79     0.007 265     0.007  36     0.007 184     0.011 167     0.009 112     0.012 181
DCP 9       .250        1.256      0.210  83     0.031 103     0.038 155     0.018 205     0.009 282     0.005 138     0.038 293     0.004 353     0.007 249
DCP10       .300        1.148      0.199  79     0.023  99     0.031 144     0.018 200     0.013 292     0.033 188     0.002 284     0.001 186     0.007 212
DCP11       .399        1.028      0.211  72     0.038  75     0.038 151     0.013 204     0.007 330     0.004 222     0.014 346     0.012  39     0.006 188
DCP12       .501        0.863      0.193  66     0.035  56     0.032 134     0.019 224     0.006 270     0.007 131     0.003 356     0.016  37     0.010 166
DCP13       .600        0.732      0.196  60     0.040  44     0.024 134     0.039 215     0.010 249     0.033 227     0.002 296     0.017  24     0.012 118
DCP14       .701        0.643      0.183  54     0.054  28     0.017 118     0.036 243     0.006 224     0.036 149     0.033 284     0.018  25     0.007 108
DCP15       .800        0.497      0.172  51     0.047  35     0.013 118     0.002 189     0.007 198     0.002 126     0.002 146     0.021  31     0.003 127
DCP16       .900        0.209      0.118  59     0.024  27     0.008  89     0.007 233     0.002 205     0.036  65     0.038  56     0.021  17     0.007  27
DCP17       .969        0.050      0.056  75     0.005 343     0.006  91     0.005 125     0.004  67     0.003  26     0.033 336     0.019  12     0.001 198
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                        FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          22.84        0.085        0.405        5.15         0.0          0.02        12023.1       20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
           136.6        53458.       0.71E 07    -0.031        0.595         5.14       -0.00070      0.773        0.0
          (448.3)      (1116.5)                                    HARMONIC ANALYSIS
DATA
TYPE       X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               0.017    5.150   0    0.243   8    0.038 250    0.013 258    0.011  47    0.010 110    0.014 167    0.012 163    0.008 231
CN                  0.115    0.480 354    0.018 359    0.001 216    0.002 293    0.000  25    0.001 236    0.002  91    0.005 142    0.002 226
CM                 -0.015    0.011 306    0.001 309    0.001  33    0.001 128    0.000 254    0.000 116    0.001 314    0.002   1    0.001  50

DCP 1     .010     -0.776    3.472 347    0.301  38    0.092 126    0.019 188    0.007 168    0.018 170    0.009 301    0.019  28    0.007  66
DCP 2     .020     -0.372    2.448 350    0.091 339    0.016 330    0.012  16    0.005 105    0.010 177    0.006   9    0.019  67    0.003  89
DCP 3     .030     -0.071    2.049 350    0.079 325    0.009 330    0.003 256    0.002 269    0.009 171    0.002 354    0.012  71    0.003  73
DCP 4     .049      0.144    1.673 350    0.064 320    0.006 325    0.002 295    0.001  92    0.007 177    0.006  18    0.015  59    0.004  97
DCP 5     .074      0.310    1.347 350    0.048 342    0.006 324    0.005  17    0.004 288    0.003 201    0.006 357    0.013  66    0.003  28
DCP 6     .099      0.349    1.167 351    0.040 342    0.009 327    0.006 260    0.002 151    0.002 184    0.006 359    0.012  57    0.001 176
DCP 7     .149      0.239    0.871 351    0.032 352    0.002 276    0.000  27    0.001 159    0.001 298    0.004   5    0.014  59    0.003 220
DCP 8     .200      0.190    0.711 354    0.025 351    0.000 142    0.002 255    0.001 297    0.003 236    0.001 301    0.011  73    0.002 156
DCP 9     .250      0.174    0.624 353    0.024 347    0.001  26    0.005 236    0.002 257    0.004 239    0.003  80    0.007 152    0.002  28
DCP10     .300      0.182    0.523 353    0.017 353    0.001  23    0.001 295    0.003 340    0.003 208    0.002  48    0.007 168    0.001 265
DCP11     .399      0.169    0.421 358    0.016   5    0.002 335    0.001   7    0.000 242    0.003 359    0.003 110    0.012 173    0.002 316
DCP12     .501      0.114    0.322 354    0.014   6    0.002 198    0.006 293    0.002 266    0.004 253    0.006  98    0.007 185    0.002 239
DCP13     .600      0.131    0.244   2    0.012  12    0.003 239    0.002 281    0.002  34    0.001 191    0.006 129    0.006 172    0.004 200
DCP14     .701      0.193    0.177   3    0.006  45    0.003 202    0.002 322    0.002 110    0.001  25    0.002  83    0.009 175    0.001 202
DCP15     .800      0.083    0.103   6    0.005  67    0.001  98    0.003 325    0.002 144    0.001 287    0.005 159    0.005 183    0.004 226
DCP16     .900     -0.084    0.030  16    0.001  48    0.002 189    0.003 309    0.003 300    0.001 260    0.002 108    0.011 166    0.006 224
DCP17     .969     -0.043    0.017 163    0.004 189    0.004 211    0.001 268    0.006  65    0.004 268    0.001 225    0.003  96    0.003 287
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                        FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          23.07        0.086        0.403        5.15         0.0          4.22        12023.2       20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
           135.8        52501.       0.70E 07    -0.020        0.828         9.35       -0.00060      0.553        0.0
          (445.5)      (1096.5)                                    HARMONIC ANALYSIS
DATA
TYPE       X/C     RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.221    5.153   0    0.203  16    0.031 283    0.002 202    0.022   0    0.013 169    0.035 143    0.012 109    0.007 342
CN                  0.386    0.447 355    0.017  11    0.005 353    0.000 155    0.002 315    0.001 286    0.002  45    0.002 113    0.001  21
CM                 -0.008    0.038 283    0.002 255    0.001 204    0.000 105    0.001 209    0.001 166    0.000 275    0.001 269    0.000 210

DCP 1     .010      1.236    2.764 348    0.128   0    0.041 144    0.031 112    0.025 256    0.020 221    0.015   6    0.007 194    0.001 272
DCP 2     .020      1.072    2.151 352    0.086 343    0.008 171    0.016 127    0.024 259    0.008 275    0.015 336    0.009 182    0.003 244
DCP 3     .030      1.107    1.810 351    0.065 313    0.029 335    0.010 133    0.021 290    0.005 236    0.008  56    0.012 190    0.005 181
DCP 4     .049      1.127    1.526 351    0.061 318    0.014 333    0.013 285    0.005 312    0.010 165    0.034 306    0.007 265    0.001 276
DCP 5     .074      1.099    1.225 352    0.035 337    0.004 300    0.004 303    0.004  70    0.007 139    0.031 326    0.004 219    0.002  21
DCP 6     .099      1.029    1.055 353    0.030 355    0.011 335    0.002 275    0.003 239    0.000 152    0.002   6    0.004 182    0.001 259
DCP 7     .149      0.763    0.792 354    0.023  11    0.006 330    0.003 283    0.003 342    0.334 217    0.032 331    0.036 253    0.004 320
DCP 8     .200      0.632    0.649 357    0.027  15    0.007 336    0.005  59    0.003 285    0.002 302    0.033 330    0.002 245    0.002 122
DCP 9     .250      0.494    0.623 353    0.024  10    0.009 351    0.000  21    0.003 299    0.005 259    0.032 334    0.003 113    0.001  90
DCP10     .300      0.459    0.521 354    0.022  17    0.009 333    0.032 143    0.032 283    0.001 158    0.033  40    0.001  67    0.005 306
DCP11     .399      0.390    0.417 358    0.020  28    0.005 340    0.002 160    0.005 303    0.001 298    0.005  90    0.004  90    0.001 122
DCP12     .501      0.281    0.321   0    0.013  28    0.004   4    0.001 227    0.004 357    0.003 294    0.032  47    0.003  71    0.002 137
DCP13     .600      0.256    0.242   2    0.011  40    0.006   5    0.003 197    0.000  32    0.034 322    0.032  60    0.007  76    0.003 186
DCP14     .701      0.285    0.166   4    0.014  46    0.005  15    0.001  29    0.000 286    0.003 284    0.003 146    0.008 132    0.003  76
DCP15     .800      0.136    0.099   8    0.011  62    0.004  14    0.031  79    0.002   1    0.002 352    0.033  74    0.034  93    0.002  44
DCP16     .900     -0.069    0.034  10    0.004 356    0.002  42    0.004 293    0.004  63    0.001  46    0.032 319    0.002 154    0.006 349
DCP17     .969     -0.052    0.017 164    0.001 104    0.002  95    0.004  92    0.004 333    0.006  15    0.002  96    0.004  90    0.002  18
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H          ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0          23.01        0.087          0.398        5.17         0.0            4.99        12023.3       20

                 V            Q            RN             CM(MIN)      CN(MAX)      ALPHA.NMAX     AERO DAMP    TOR          EXT DAMP
                  134.2        51940.       0.70E 07      -0.022        1.066        10.13         -0.00087      0.934        0.0
                 (440.3)      (1084.8)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.990    5.170   0    0.239  12    0.045 249    0.011 315    0.016  36    0.011  10    0.015 179    0.025 233    0.002 141
CN                  0.616    0.459 355    0.035  19    0.008 300    0.004 178    0.002  55    0.002 273    0.001 125    0.008 269    0.000 211
CM                 -0.005    0.016 316    0.004 236    0.001 111    0.001 332    0.001 215    0.000  94    0.000  14    0.003  82    0.000 221

DCP 1     .010      2.947    3.486 349    0.271 287    0.050 167    0.074 232    0.092 143    0.056  52    0.027 340    0.014 336    0.021 277
DCP 2     .020      2.205    2.449 351    0.131 351    0.044 192    0.073  86    0.091 346    0.086 251    0.053 155    0.021  62    0.008 110
DCP 3     .030      2.063    2.026 351    0.126  21    0.039 337    0.021 247    0.011 149    0.002 273    0.005  89    0.005  38    0.003  15
DCP 4     .049      1.938    1.703 351    0.101  18    0.042 332    0.019 249    0.008 156    0.003 147    0.005  26    0.005 278    0.002  46
DCP 5     .074      1.751    1.336 351    0.076  11    0.028 324    0.009 234    0.001 140    0.002 189    0.001 314    0.005 315    0.001 119
DCP 6     .099      1.574    1.137 352    0.075  19    0.017 324    0.007 213    0.002 113    0.003 219    0.002  26    0.005 297    0.001 241
DCP 7     .149      1.156    0.[illegible]2 353    0.055  11    0.011 299    0.001 213    0.002  35    0.004 299    0.005  70    0.005 287    0.001 295
DCP 8     .200      0.936    0.696 355    0.049  21    0.005 350    0.002 168    0.003  42    0.003 284    0.004  96    0.005 349    0.001 175
DCP 9     .250      0.812    0.597 354    0.046  17    0.009 268    0.004 131    0.004 305    0.003 262    0.002 244    0.009 234    0.000  51
DCP10     .300      0.729    0.494 355    0.039  17    0.009 269    0.003 131    0.002  40    0.002 259    0.001 300    0.010 247    0.001 203
DCP11     .399      0.603    0.390   0    0.033  27    0.008 300    0.003 151    0.002  27    0.001 256    0.002 178    0.012 270    0.002 190
DCP12     .501      0.445    0.299   2    0.029  35    0.006 289    0.002 143    0.001  80    0.002 312    0.002 119    0.007 286    0.002 173
DCP13     .600      0.373    0.221 [illegible]    0.029  39    0.007 278    0.003 146    0.002 120    0.003 294    0.002 121    0.010 276    0.002 147
DCP14     .701      0.359    0.139   9    0.031  44    0.007 318    0.008 182    0.002  33    0.000 284    0.002 218    0.012 252    0.001 275
DCP15     .800      0.177    0.078  16    0.025  43    0.007 303    0.005 162    0.007  33    0.002 245    0.002 322    0.012 257    0.002 341
DCP16     .900     -0.055    0.030  22    0.009  18    0.005 273    0.002 185    0.002 152    0.001 266    0.002 117    0.012 261    0.003  57
DCP17     .969     -0.059    0.014 162    0.007 321    0.003 336    0.003 150    0.004  26    0.003 271    0.002 205    0.009 279    0.002 301

                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H          ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0          23.11        0.088          0.397        5.16         0.0            7.51        12023.4       20

                 V            Q            RN             CM(MIN)      CN(MAX)      ALPHA.NMAX     AERO DAMP    TOR          EXT DAMP
                  133.7        51663.       0.70E 07      -0.018        1.214        12.21         -0.00112      1.201        0.0
                 (438.5)      (1079.0)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.508    5.162   0    0.244  15    0.042 280    0.024 264    0.027  81    0.022  34    0.022 255    0.008 269    0.009 149
CN                  0.786    0.337   8    0.115  25    0.044 277    0.018 149    0.008   1    0.004 209    0.002   2    0.005 328    0.002 103
CM                  0.001    0.020 309    0.005 147    0.008   0    0.007 248    0.005 140    0.003  27    0.001 255    0.001 148    0.001 312

DCP 1     .010      3.882    2.176 349    0.846  71    0.741 356    0.414 274    0.126 206    0.019 277    0.078 251    0.068 178    0.027  51
DCP 2     .020      3.142    1.832 358    0.505  37    0.261 332    0.204 277    0.206 209    0.141 129    0.032  62    0.050 111    0.071  50
DCP 3     .030      2.937    1.665 358    0.392  22    0.187 298    0.104 224    0.068 180    0.071 129    0.057  62    0.054   5    0.039 321
DCP 4     .049      2.615    1.311 359    0.359  31    0.169 299    0.095 204    0.064 124    0.045  49    0.026 338    0.011 320    0.013 323
DCP 5     .074      2.274    1.025 359    0.293  29    0.140 292    0.082 192    0.058 107    0.042  29    0.027 321    0.016 286    0.013 259
DCP 6     .099      2.002    0.834   1    0.257  32    0.116 294    0.065 189    0.044  95    0.034  10    0.021 289    0.005 240    0.003  15
DCP 7     .149      1.481    0.634   3    0.198  27    0.090 286    0.049 177    0.025  72    0.016 330    0.006 221    0.006  29    0.008 360
DCP 8     .200      1.205    0.536   7    0.168  22    0.084 277    0.049 172    0.024  78    0.008   1    0.006  20    0.013 341    0.012 253
DCP 9     .250      1.051    0.469   7    0.147  13    0.072 253    0.047 133    0.029  23    0.018 268    0.008 174    0.008 336    0.004 155
DCP10     .300      0.918    0.377   8    0.129  15    0.061 253    0.039 130    0.026  15    0.012 263    0.003 237    0.004 284    0.007 125
DCP11     .399      0.749    0.300  16    0.111  19    0.053 251    0.034 126    0.025   6    0.013 257    0.001  40    0.007 317    0.008 130
DCP12     .501      0.552    0.221  21    0.091  19    0.040 243    0.031 106    0.023 342    0.015 218    0.005  65    0.007 315    0.007 134
DCP13     .600      0.435    0.151  34    0.085  25    0.034 248    0.026  98    0.020 331    0.014 208    0.006  56    0.005 309    0.006 117
DCP14     .701      0.385    0.087  61    0.077  30    0.023 241    0.025  73    0.025 314    0.015 187    0.006  55    0.005 310    0.004  93
DCP15     .800      0.201    0.064  57    0.037  19    0.018 186    0.022  55    0.021 303    0.010 184    0.001 351    0.002 345    0.001  18
DCP16     .900     -0.030    0.050  28    0.024 287    0.020 159    0.016  39    0.008 270    0.004 163    0.002 324    0.007 345    0.000 278
DCP17     .969     -0.052    0.015  14    0.020 264    0.010 148    0.008  22    0.004 256    0.003 135    0.001 110    0.009 349    0.001 160
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                             FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
              0.0         23.09       0.088       0.396       5.11        0.0         9.98       12023.5      20

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
              133.1       51217.      0.70E 07   -0.079       1.319       13.88      -0.00120     1.281       0.0
             (436.7)     (1069.7)                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.976   5.115   0   0.241  23   0.036 277   0.030  27   0.049 334   0.037 228   0.056 119   0.004 184   0.012 283
CN                 0.907   0.229  38   0.143  32   0.019 353   0.027 309   0.016 199   0.007 157   0.016  82   0.008 355   0.006 303
CM                -0.009   0.025 226   0.025  99   0.010   6   0.006  47   0.009 321   0.004 266   0.005 249   0.003 158   0.003 134

DCP 1    .010      4.523   0.732 343   1.281  84   0.393  32   0.187  69   0.122  65   0.148  74   0.148  34   0.092  21   0.049 312
DCP 2    .020      3.588   0.175  19   0.814  69   0.330  38   0.205   4   0.118 359   0.105 326   0.085 346   0.086 320   0.058 280
DCP 3    .030      3.245   0.539  16   0.696  73   0.318  43   0.261  11   0.190 330   0.146 288   0.091 269   0.056 234   0.047 234
DCP 4    .049      2.948   0.512  26   0.635  59   0.232   4   0.118 317   0.062 278   0.040 244   0.012 331   0.029 268   0.046 221
DCP 5    .074      2.495   0.364  38   0.545  56   0.184 355   0.082 315   0.061 289   0.059 241   0.019 184   0.016 195   0.031 178
DCP 6    .099      2.172   0.309  47   0.470  54   0.132 348   0.046 329   0.049 305   0.048 244   0.016 178   0.012 166   0.017 162
DCP 7    .149      1.630   0.316  47   0.347  41   0.073 328   0.043 348   0.052 285   0.037 220   0.014 167   0.017 140   0.016 107
DCP 8    .200      1.352   0.329  45   0.269  34   0.053 320   0.043 337   0.047 264   0.029 203   0.016 137   0.009  91   0.010 127
DCP 9    .250      1.207   0.342  39   0.225  21   0.042 301   0.044 312   0.046 235   0.029 183   0.026 123   0.016  97   0.009  48
DCP10    .300      1.067   0.313  38   0.183  12   0.034 280   0.040 294   0.044 209   0.028 150   0.029 101   0.015  53   0.014   6
DCP11    .399      0.884   0.292  40   0.145   2   0.025 235   0.033 296   0.045 195   0.021 127   0.025 103   0.014  43   0.013   2
DCP12    .501      0.668   0.242  41   0.104 353   0.014 202   0.035 209   0.042 178   0.019 106   0.026  89   0.018  15   0.013 333
DCP13    .600      0.525   0.189  48   0.079 342   0.025 161   0.028 285   0.038 159   0.016  89   0.027  83   0.021 353   0.014 321
DCP14    .701      0.448   0.136  62   0.064 326   0.033 158   0.017 265   0.036 137   0.014  61   0.022  66   0.019 325   0.010 294
DCP15    .800      0.260   0.114  41   0.056 295   0.024 163   0.022 227   0.032 118   0.009  64   0.022  59   0.016 313   0.009 287
DCP16    .900      0.021   0.109  13   0.051 271   0.009 216   0.028 208   0.023 109   0.012  75   0.017  24   0.010 299   0.014 280
DCP17    .969     -0.031   0.057   8   0.031 275   0.006 239   0.013 209   0.009 119   0.005 117   0.007  49   0.005 333   0.002 284

                             FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
              0.0         23.03       0.086       0.403       5.03        0.0        12.48       12025.1      20

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
              136.2       53099.      0.71E 07   -0.111       1.362       14.55      -0.00149     1.626       0.0
             (446.9)     (1109.0)                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             12.482   5.033   0   0.244  18   0.045 155   0.048  57   0.009 108   0.058  12   0.059 315   0.034 265   0.013 187
CN                 0.960   0.217  84   0.087  47   0.055  75   0.021   5   0.018 340   0.012 311   0.013 268   0.008 243   0.007 183
CM                -0.026   0.052 204   0.022 104   0.012 158   0.009  96   0.009 106   0.005  61   0.005  52   0.003  19   0.002 358

DCP 1    .010 .    4.758   0.919 188   0.802  98   0.383 158   0.151 173   0.138 219   0.056 247   0.133 264   0.070 236   0.052 222
DCP 2    .020      3.694   0.515 142   0.557  99   0.257 120   0.167 140   0.156 166   0.105 165   0.108 209   0.067 217   0.080 217
DCP 3    .030      3.316   0.478 163   0.590 114   0.396 117   0.249 108   0.196 102   0.131  90   0.076 101   0.064 105   0.053 112
DCP 4    .049      2.850   0.713 146   0.590  81   0.229  94   0.162  70   0.108  58   0.072  31   0.035  50   0.033  28   0.021  96
DCP 5    .074      2.378   0.701 139   0.471  68   0.170 105   0.150  61   0.068  50   0.060  32   0.040  43   0.039  13   0.020  79
DCP 6    .099      2.106   0.637 132   0.366  57   0.155 115   0.130  46   0.035  46   0.053  17   0.020  18   0.026 357   0.008 100
DCP 7    .149      1.644   0.458 112   0.244  45   0.119 102   0.075  19   0.028  61   0.036 352   0.014  45   0.023 342   0.007  69
DCP 8    .200      1.408   0.358  96   0.177  46   0.108  87   0.054  16   0.042  44   0.034 346   0.019   0   0.020 308   0.005  89
DCP 9    .250      1.286   0.338  81   0.142  37   0.103  73   0.046  19   0.050  24   0.031 348   0.027 348   0.013 330   0.013 323
DCP10    .300      1.137   0.313  70   0.114  25   0.088  57   0.052 341   0.042 344   0.039 303   0.030 291   0.024 262   0.015 252
DCP11    .399      0.961   0.295  62   0.079  15   0.071  54   0.041 336   0.039 342   0.027 306   0.029 299   0.024 260   0.017 242
DCP12    .501      0.760   0.264  54   0.053 352   0.061  36   0.032 311   0.041 320   0.027 272   0.029 271   0.020 219   0.008 198
DCP13    .600      0.621   0.226  53   0.043 321   0.048  32   0.029 295   0.034 310   0.023 256   0.024 247   0.016 201   0.013 167
DCP14    .701      0.511   0.179  53   0.064 288   0.029  15   0.036 260   0.029 279   0.020 227   0.028 227   0.015 159   0.011 183
DCP15    .800      0.321   0.174  37   0.061 291   0.034 333   0.028 254   0.032 273   0.011 221   0.021 222   0.010 190   0.012 178
DCP16    .900      0.068   0.163  17   0.035 302   0.036 321   0.013 290   0.029 263   0.008 179   0.015 199   0.009 182   0.007 117
DCP17    .969     -0.005   0.078  14   0.017 321   0.017 324   0.011 318   0.015 272   0.011 252   0.010 169   0.008 244   0.009 145
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0          23.08        0.087        0.400        5.00         0.0          15.03        12025.2        20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                134.6        52266.       0.70E 07    -0.115        1.318        15.04       -0.00176      1.903        0.0
               (442.3)      (1091.6)                                 HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               15.029    4.987   0    0.217   7    0.047 183    0.024 213    0.018 298    0.030 156    0.020 272    0.031  37    0.003 133
CN                   0.981    0.235  96    0.057 146    0.012  94    0.038 108    0.003  69    0.007 124    0.012  37    0.010  31    0.003 112
CM                  -0.042    0.069 198    0.010 204    0.011 178    0.011 219    0.005 239    0.002 211    0.004 213    0.004 231    0.001 257

DCP 1     .010       4.536    1.723 182    0.248 248    0.162 240    0.114 322    0.078  29    0.091  54    0.073  71    0.038  84    0.055 131
DCP 2     .020       3.616    1.142 163    0.421 162    0.242 235    0.115 274    0.093   3    0.078  66    0.058  61    0.030 116    0.026 123
DCP 3     .030       3.218    1.031 171    0.375 159    0.376 213    0.261 201    0.144 275    0.113 270    0.059 336    0.049 340    0.007 116
DCP 4     .049       2.717    1.109 153    0.324 143    0.232 154    0.153 161    0.042 200    0.043 203    0.014   2    0.032   7    0.009 339
DCP 5     .074       2.273    0.939 144    0.189 165    0.189 147    0.116 169    0.039 214    0.057 239    0.018 298    0.029 321    0.008 324
DCP 6     .099       2.027    0.773 136    0.160 186    0.129 129    0.097 167    0.020 259    0.050 183    0.011 299    0.015 332    0.008 296
DCP 7     .149       1.616    0.537 118    0.148 182    0.071 104    0.085 150    0.034 257    0.031 146    0.005 308    0.021 319    0.001 312
DCP 8     .200       1.412    0.410 106    0.133 166    0.045 107    0.085 142    0.027 220    0.023 149    0.007  69    0.017 313    0.005   1
DCP 9     .250       1.306    0.363  96    0.111 136    0.040  77    0.082 125    0.020 178    0.016 133    0.009 217    0.007 235    0.007 215
DCP10     .300       1.173    0.317  85    0.097 128    0.031  63    0.081 111    0.006 147    0.017 133    0.006 149    0.004 165    0.007 183
DCP11     .399       1.011    0.284  69    0.070 119    0.021  40    0.074  98    0.014 114    0.019  99    0.013  78    0.011 104    0.009 183
DCP12     .501       0.815    0.267  55    0.041 111    0.023   2    0.056  77    0.017 100    0.016  78    0.024  67    0.017  69    0.011  98
DCP13     .600       0.667    0.250  47    0.015 126    0.030 356    0.047  62    0.017  67    0.011  36    0.027  45    0.015  52    0.004 120
DCP14     .701       0.551    0.231  40    0.009 299    0.044 351    0.044  42    0.018  50    0.010   5    0.023  32    0.020  43    0.003  14
DCP15     .800       0.379    0.233  27    0.026  24    0.044 348    0.039  28    0.017  43    0.009 342    0.016  26    0.017  39    0.004  95
DCP16     .900       0.127    0.179  18    0.050  40    0.020  16    0.027  16    0.018  32    0.004  57    0.016 354    0.013  18    0.009  70
DCP17     .969       0.018    0.081  18    0.032  41    0.011  49    0.016  17    0.006  19    0.003 108    0.009 350    0.014  40    0.007  12

                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                 0.0          23.05        0.088        0.397        5.01         0.0          17.46        12025.3        20

               V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                133.7        51538.       0.70E 07    -0.136        1.274        15.19       -0.00235      2.524        0.0
               (438.8)      (1076.4)                                 HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               17.465    5.011   0    0.198   2    0.037 251    0.018 339    0.022 355    0.020 100    0.022 267    0.010 248    0.012 331
CN                   0.965    0.203  92    0.052 129    0.031 196    0.015 224    0.011 231    0.012 247    0.002  16    0.014 253    0.002 120
CM                  -0.064    0.064 206    0.024 238    0.006 283    0.005 328    0.002  20    0.003  30    0.001  96    0.005  46    0.001 197

DCP 1     .010       3.954    1.680 191    0.371 274    0.246   9    0.092 345    0.060  96    0.022 318    0.020 195    0.048 255    0.021 330
DCP 2     .020       3.178    1.415 180    0.187 220    0.197 315    0.082  11    0.091  76    0.012 260    0.028 225    0.028 312    0.019 291
DCP 3     .030       2.812    1.348 171    0.217 264    0.244 244    0.239 335    0.023   8    0.049  35    0.052 161    0.007 205    0.040 213
DCP 4     .049       2.416    1.021 156    0.327 209    0.184 209    0.094 242    0.025 254    0.019 257    0.024 121    0.018 204    0.005 171
DCP 5     .074       2.032    0.744 142    0.318 212    0.098 211    0.078 240    0.022 296    0.007 327    0.024  84    0.005 178    0.015 173
DCP 6     .099       1.631    0.551 129    0.261 205    0.070 229    0.041 231    0.019 267    0.011 337    0.013  63    0.005 235    0.008 145
DCP 7     .149       1.521    0.369 103    0.171 183    0.059 218    0.022 262    0.010 262    0.018 316    0.011  54    0.005  59    0.010 106
DCP 8     .200       1.350    0.332  95    0.140 167    0.065 213    0.037 275    0.021 272    0.027 294    0.018 336    0.012 314    0.002 329
DCP 9     .250       1.261    0.275  85    0.129 136    0.070 200    0.027 230    0.019 234    0.018 265    0.013  31    0.016 331    0.009 186
DCP10     .300       1.164    0.262  78    0.115 115    0.076 192    0.027 219    0.030 234    0.020 245    0.013 356    0.020 285    0.006 131
DCP11     .399       1.030    0.254  66    0.108  97    0.055 184    0.023 205    0.030 230    0.022 239    0.003  12    0.027 301    0.006 192
DCP12     .501       0.896    0.244  53    0.102  80    0.039 165    0.018 205    0.022 226    0.019 244    0.003 290    0.025 271    0.003 109
DCP13     .600       0.717    0.251  48    0.091  74    0.027 144    0.014 188    0.010 216    0.015 233    0.004 329    0.024 257    0.008  69
DCP14     .701       0.608    0.242  39    0.078  63    0.019 102    0.021 156    0.004 187    0.011 225    0.005 290    0.025 222    0.006   6
DCP15     .800       0.455    0.223  35    0.072  56    0.020  77    0.024 140    0.008 153    0.015 205    0.004 201    0.024 206    0.004  44
DCP16     .900       0.194    0.143  40    0.053  47    0.011  74    0.016 139    0.002 134    0.010 191    0.003 227    0.017 189    0.004 288
DCP17     .969       0.046    0.060  52    0.025  48    0.004  52    0.002 163    0.005 206    0.007 165    0.003 235    0.019 202    0.006 280
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0 -  TEST POINT  CYCLES ANALYSED
                 0.0      23.05      0.088      0.395      5.04       0.0        19.94     12025.4      20

               V         Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               132.9     50830.      0.69E 07  -0.146      1.169      19.96     -0.00286    3.051       0.0
              (436.0)   (1061.6)                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             19.940   5.043   0  0.220   7  0.040 248  0.008 266  0.028  24  0.012  85  0.013 209  0.018  53  0.002   2
CN                 0.960   0.172  83  0.032  72  0.024 152  0.003 249  0.002   4  0.005 157  0.002 244  0.009 358  0.003 180
CM                -0.087   0.047 229  0.014 230  0.004 316  0.001 225  0.001  83  0.002 261  0.000 323  0.002 177  0.000 321

DCP 1    .010      3.214   1.524 187  0.020 337  0.159 313  0.116  94  0.021  72  0.085 232  0.037  77  0.035 277  0.013 170
DCP 2    .020      2.710   1.122 176  0.087 302  0.074 207  0.086  58  0.045 175  0.052 189  0.022 290  0.024 179  0.007 349
DCP 3    .030      2.463   1.032 160  0.281 261  0.142 109  0.038 222  0.093  85  0.059 171  0.023  27  0.020 200  0.029 324
DCP 4    .049      1.996   0.340 147  0.120 253  0.014 201  0.031 285  0.008  16  0.014 186  0.025 234  0.020 318  0.005 125
DCP 5    .074      1.716   0.217  90  0.055 181  0.019 171  0.026 256  0.015  58  0.020 176  0.015 259  0.013 342  0.008  98
DCP 6    .099      1.625   0.224  64  0.068 139  0.037 150  0.025 264  0.008 329  0.008 144  0.013 228  0.010  34  0.005 152
DCP 7    .149      1.469   0.224  50  0.068 116  0.029 132  0.024 236  0.007 309  0.003 145  0.004 231  0.009 346  0.003 268
DCP 8    .200      1.333   0.180  66  0.065 108  0.034 175  0.027 216  0.017 356  0.017 204  0.002 314  0.001   3  0.009 183
DCP 9    .250      1.282   0.205  81  0.047 120  0.048 188  0.016 236  0.005 265  0.005  51  0.008 189  0.009  41  0.005 175
DCP10    .300      1.197   0.213  82  0.037  98  0.046 165  0.021 238  0.004 244  0.005 249  0.004 280  0.009  36  0.007 194
DCP11    .399      1.092   0.222  81  0.046  76  0.041 159  0.012 288  0.006 344  0.003 252  0.007 258  0.018   3  0.007 238
DCP12    .501      0.925   0.221  73  0.046  65  0.034 127  0.006 161  0.007 334  0.003  80  0.003 291  0.015   8  0.010 183
DCP13    .600      0.776   0.214  63  0.057  54  0.022 142  0.009  73  0.003 158  0.004 143  0.002 231  0.012   3  0.012 168
DCP14    .701      0.674   0.206  55  0.065  46  0.018 142  0.008  31  0.001 246  0.009  95  0.001  99  0.010 346  0.003 108
DCP15    .800      0.522   0.185  50  0.063  41  0.014 153  0.010  13  0.003 186  0.008 103  0.002  40  0.008   8  0.005  38
DCP16    .900      0.237   0.136  64  0.035  47  0.010 109  0.007  74  0.003 252  0.007 109  0.004 164  0.007 324  0.006 346
DCP17    .969      0.064   0.072  76  0.015  55  0.008 101  0.001 170  0.003 331  0.008  97  0.002 100  0.006 332  0.002 149
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0      45.66      0.169      0.406      5.51       0.0         0.02     12027.1      20

               V         Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
               137.2     48752.      0.64E 07  -0.035      0.515       5.47     -0.00067    0.74[illegible]      0.0
              (450.1)   (1018.2)                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              0.017   5.513   0  0.273   6  0.106 302  0.013 180  0.010  30  0.021  71  0.045 [illegible]  0.023 136  0.002 332
CN                 0.122   0.408 357  0.019  26  0.004  17  0.002 257  0.003 227  0.002  83  0.004 [illegible]  0.001 359  0.001 282
CM                -0.014   0.018 278  0.002 295  0.001 206  0.002  76  0.000 104  0.000 300  0.001 [illegible]  0.001 115  0.000 335

DCP 1    .010     -0.659   2.822 342  0.201  30  0.341 143  0.006  88  0.018 163  0.031 315  0.013 [illegible]  0.011   2  0.002 164
DCP 2    .020     -0.317   2.009 348  0.093 350  0.011  30  0.018  63  0.013 167  0.005  28  0.012 [illegible]  0.011 333  0.007 285
DCP 3    .030     -0.026   1.695 348  0.075 342  0.009  48  0.011  59  0.007 168  0.004  10  0.012 [illegible]  0.001  48  0.004 343
DCP 4    .049      0.178   1.376 348  0.062 345  0.003  73  0.009  68  0.005 224  0.005  51  0.013 [illegible]  0.005 230  0.005 269
DCP 5    .074      0.339   1.115 349  0.049 357  0.008  88  0.008  80  0.003 168  0.007  17  0.020 [illegible]  0.004 121  0.004 269
DCP 6    .099      0.384   0.955 350  0.044 356  0.005 106  0.005  69  0.004 216  0.005  74  0.031 [illegible]  0.003 147  0.005 266
DCP 7    .149      0.252   0.705 351  0.032   7  0.006 117  0.013 136  0.003 186  0.005  75  0.015 [illegible]  0.003 177  0.004 256
DCP 8    .200      0.204   0.571 357  0.028  24  0.006  56  0.004  47  0.004 178  0.004  76  0.029 [illegible]  0.004 285  0.007  18
DCP 9    .250      0.173   0.576 355  0.025  22  0.009 353  0.003 205  0.004 228  0.005 133  0.035 [illegible]  0.006 129  0.003   8
DCP10    .300      0.183   0.486 356  0.022  21  0.006 339  0.004 255  0.005 217  0.001  14  0.022 [illegible]  0.007 106  0.001  20
DCP11    .399      0.179   0.393   6  0.023  45  0.009   1  0.010 300  0.004 219  0.001  34  0.005 [illegible]  0.008  62  0.003 319
DCP12    .501      0.112   0.302  13  0.018  49  0.003  29  0.005 258  0.006 268  0.005 193  0.005 [illegible]  0.004  43  0.004 162
DCP13    .600      0.131   0.229  15  0.013  65  0.006  10  0.006 228  0.004 238  0.001 336  0.005 [illegible]  0.003 332  0.002 215
DCP14    .701      0.187   0.161  19  0.012  66  0.008  38  0.007 239  0.004 344  0.003  57  0.027 [illegible]  0.005 307  0.001 133
DCP15    .800      0.086   0.098  29  0.009  74  0.003  98  0.004 263  0.001 260  0.004 163  0.003 [illegible]  0.007 310  0.002  97
DCP16    .900     -0.089   0.029  50  0.007 129  0.008  66  0.008 256  0.001   7  0.003 341  0.008 [illegible]  0.009 238  0.002  10
DCP17    .969     -0.038   0.023 176  0.003 213  0.005 298  0.005 259  0.005 199  0.005  76  0.033 [illegible]  0.004 102  0.006 219
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         45.67       0.171       0.402       5.52        0.0         2.46       12027.2      20

                  V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   135.6       47871.      0.64E 07   -0.033       0.798        7.93      -0.00376     0.849       0.0
                  (444.9)     (999.8)                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.460    5.518   0   0.316   4   0.083 297   0.055 349   0.034  83   0.038  56   0.034 [illegible]   0.033 238   0.004   3
CN                  0.361    0.443 357   0.022  14   0.007   4   0.012  21   0.001 187   0.001 256   0.004 [illegible]   0.003 158   0.000 236
CM                 -0.007    0.023 295   0.003 275   0.000 264   0.005 185   0.001 297   0.000 339   0.001 [illegible]   0.001 222   0.000 144

DCP 1    .013       1.091    3.023 342   0.158 343   0.018 101   0.016  82   0.019 251   0.009 243   0.038 [illegible]   0.018 193   0.002 188
DCP 2    .020       0.931    2.357 348   0.120 341   0.027 344   0.009 105   0.021 289   0.011 216   0.013 [illegible]   0.029 160   0.005 282
DCP 3    .030       1.031    2.010 347   0.094 338   0.035 325   0.005 153   0.013 282   0.009 238   0.036 [illegible]   0.023 160   0.012 142
DCP 4    .049       1.060    1.652 348   0.075 333   0.017 348   0.018 134   0.007 272   0.009 318   0.039 [illegible]   0.002 105   0.005 157
DCP 5    .074       1.053    1.312 348   0.065 349   0.021  10   0.014 145   0.002 210   0.014   0   0.009 [illegible]   0.008  78   0.004 152
DCP 6    .099       0.982    1.114 350   0.058 355   0.016   6   0.014 119   0.005 308   0.013   6   0.036 [illegible]   0.002 134   0.005 126
DCP 7    .149       0.735    0.826 351   0.042   7   0.009 348   0.015  73   0.005 135   0.003 330   0.033 [illegible]   0.004 276   0.002 246
DCP 8    .200       0.579    0.685 357   0.031  11   0.014   1   0.013 126   0.009 243   0.001 353   0.033 [illegible]   0.019 222   0.009 258
DCP 9    .253       0.465    0.582 355   0.031   4   0.010 349   0.019  18   0.002 230   0.008 213   0.034 [illegible]   0.015 209   0.003  23
DCP10    .300       0.435    0.480 356   0.024   9   0.011   6   0.013 336   0.002 242   0.002 223   0.005 [illegible]   0.010 190   0.007  99
DCP11    .399       0.371    0.390   6   0.026  42   0.010  10   0.022  11   0.003  88   0.004 223   0.038 [illegible]   0.036 144   0.001  93
DCP12    .501       0.266    0.299  11   0.023  55   0.008 339   0.015  17   0.003 283   0.001 207   0.038 [illegible]   0.005 136   0.001 101
DCP13    .600       0.241    0.220  17   0.015  56   0.010 338   0.014  12   0.004 177   0.007  41   0.038 [illegible]   0.006  40   0.003 112
DCP14    .701       0.265    0.158  21   0.014  42   0.010  81   0.015 355   0.010 118   0.004 218   0.039 [illegible]   0.003  90   0.001 264
DCP15    .800       0.129    0.096  34   0.011  71   0.003 145   0.020  15   0.002  69   0.003 224   0.039 [illegible]   0.009   8   0.003 288
DCP16    .900      -0.075    0.036  56   0.008  55   0.004  21   0.019  15   0.003 203   0.001 141   0.037 [illegible]   0.036  63   0.007 351
DCP17    .969      -0.052    0.024 165   0.002 238   0.008 187   0.018   7   0.009  91   0.004  91   0.035 [illegible]   0.006 228   0.005 235

                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         45.71       0.173       0.400       5.50        0.0         4.98       12027.3      20

                  V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                   134.9       47512.      0.64E 07   -0.030       0.984       10.41      -0.00377     0.851       0.0
                  (442.5)     (992.3)                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               4.978    5.498   0   0.272  10   0.089 330   0.031 263   0.024  65   0.022  86   0.021 [illegible]   0.013  44   0.036 212
CN                  0.608    0.384   0   0.029  25   0.005 329   0.004 219   0.001 217   0.001 140   0.023 [illegible]   0.003 242   0.002 235
CM                 -0.006    0.022 286   0.003 219   0.001  41   0.002  72   0.000  61   0.000 345   0.000 [illegible]   0.002  35   0.000  55

DCP 1    .010       2.829    2.759 343   0.176 296   0.025 160   0.039 206   0.066 137   0.041  52   0.037 [illegible]   0.005 346   0.009 284
DCP 2    .020       2.114    1.937 349   0.108  13   0.023 214   0.086  87   0.052 353   0.051 257   0.033 [illegible]   0.017  94   0.006 158
DCP 3    .030       2.021    1.622 348   0.110  32   0.037 345   0.036 240   0.018 163   0.008  57   0.034 [illegible]   0.012  75   0.003 153
DCP 4    .049       1.893    1.356 349   0.081  29   0.042 343   0.009 180   0.009 185   0.008  93   0.028 [illegible]   0.009  95   0.002 275
DCP 5    .074       1.722    1.078 350   0.069  28   0.023 339   0.035 165   0.039 189   0.003 142   0.033 [illegible]   0.010  51   0.004 204
DCP 6    .099       1.567    0.932 351   0.063  31   0.015 346   0.013  96   0.004 201   0.002 230   0.033 [illegible]   0.005  55   0.005 165
DCP 7    .149       1.130    0.672 353   0.036  28   0.013 352   0.010  86   0.008 188   0.003 104   0.030 [illegible]   0.010   1   0.001  28
DCP 8    .200       0.922    0.558 359   0.041  39   0.012 356   0.016 126   0.003 317   0.005 161   0.035 [illegible]   0.006 233   0.002 291
DCP 9    .253       0.812    0.559 357   0.037  11   0.004  15   0.007 237   0.001  11   0.003 236   0.034 [illegible]   0.013 345   0.003 282
DCP10    .300       0.729    0.466 359   0.033  12   0.007 330   0.009 252   0.004 317   0.004 154   0.033 [illegible]   0.036 307   0.003 227
DCP11    .399       0.603    0.367   9   0.032  32   0.003 325   0.007 287   0.009 308   0.002 113   [illegible]         0.011 263   0.006 244
DCP12    .501       0.443    0.284  15   0.021  40   0.006 254   0.008 251   0.003 285   0.001 285   0.016 [illegible]   0.006 258   0.002 273
DCP13    .600       0.375    0.208  22   0.025  30   0.004 245   0.036 270   0.003 187   0.003 108   0.037 [illegible]   0.035 240   0.006 225
DCP14    .701       0.352    0.138  33   0.027  31   0.005 349   0.005 190   0.001 142   0.003  17   0.005 [illegible]   0.011 195   0.001  74
DCP15    .800       0.181    0.086  45   0.017  38   0.002 353   0.035 235   0.002 207   0.003 192   0.001 [illegible]   0.011 195   0.002 206
DCP16    .900      -0.059    0.039  62   0.008 357   0.006 237   0.009 239   0.004 124   0.003 162   0.034 [illegible]   0.009 191   0.002 128
DCP17    .969      -0.061    0.014 172   0.004  11   0.004 124   0.008 257   0.002  32   0.002 205   0.034 [illegible]   0.007 348   0.004 354
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ  DRIVE HZ   K          MACH NO   DEL.ALPHA  DEL.H     ALPHA.0   TEST POINT  CYCLES ANALYSED
                  0.0       45.20     0.171      0.399     5.43       0.0        7.46    12027.4       20

                V         Q          RN         CM(MIN)   CN(MAX)    ALPHA.NMAX AERO DAMP TDR         EXT DAMP
                 134.2     47224.     0.64E 07  -0.031     1.263      12.65     -0.00095   1.349       0.0
                (440.3)   (986.3)                            HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI           RES 8 PHI  RES 9 PHI

ALPHA               7.465   5.427   0  0.273  15  0.114 291  0.017 333  0.025  72  0.022 107  0.014 [illegible]  0.011 156  0.007 240
CN                  0.775   0.401  16  0.078 339  0.016 178  0.011 137  0.003 208  0.003 191  0.036  54          0.035 298  0.001 163
CM                  0.001   0.027 286  0.010  59  0.011 287  0.001 158  0.002  40  0.001  86  0.000 [illegible]  0.001 271  0.001 224

DCP 1     .010      3.542   1.886 354  0.915  48  0.734 325  0.345 227  0.030  29  0.157 225  0.119 [illegible]  0.060 334  0.058 191
DCP 2     .020      2.929   1.668   4  0.586  30  0.364 313  0.214 234  0.117 186  0.136 150  0.055 [illegible]  0.062  47  0.049 358
DCP 3     .030      2.844   1.670   2  0.419   7  0.249 284  0.179 196  0.107 117  0.053  68  0.042 [illegible]  0.032 333  0.033 309
DCP 4     .049      2.585   1.441   2  0.311 356  0.139 258  0.083 145  0.034  53  0.038 142  0.035 [illegible]  0.037 305  0.018 243
DCP 5     .074      2.276   1.160   4  0.254 348  0.114 237  0.075 116  0.033  19  0.013 161  0.041 [illegible]  0.048 285  0.031 212
DCP 6     .099      1.999   0.972   6  0.220 347  0.094 229  0.060 113  0.020  14  0.007  53  0.032 [illegible]  0.038 268  0.021 190
DCP 7     .149      1.476   0.760   9  0.179 341  0.078 213  0.050  99  0.011 359  0.003 125  0.019 [illegible]  0.019 228  0.013 149
DCP 8     .200      1.212   0.634  15  0.140 337  0.061 200  0.038  78  0.010 299  0.013  64  0.021 [illegible]  0.016 247  0.006 146
DCP 9     .250      1.052   0.588  10  0.104 298  0.068 144  0.037  52  0.018 272  0.006 182  0.003 [illegible]  0.002  13  0.007 151
DCP10     .300      0.920   0.483  12  0.079 299  0.058 130  0.020  29  0.016 191  0.007  20  0.035 [illegible]  0.005  83  0.005 314
DCP11     .399      0.739   0.381  25  0.062 314  0.050 136  0.016  49  0.012 244  0.006 283  0.038 [illegible]  0.003  18  0.001 285
DCP12     .501      0.549   0.303  30  0.048 305  0.040 131  0.008  75  0.008 269  0.007 243  0.012 [illegible]  0.009 310  0.005 198
DCP13     .600      0.432   0.235  45  0.050 323  0.036 130  0.003  49  0.011 213  0.005 224  0.002 [illegible]  0.009 293  0.008  90
DCP14     .701      0.371   0.176  65  0.047 325  0.028 120  0.006 315  0.007 186  0.005 292  0.010 [illegible]  0.004  56  0.008  48
DCP15     .800      0.196   0.128  67  0.023 301  0.030  94  0.009 283  0.008 163  0.032 320  0.039  67          0.034 161  0.008  41
DCP16     .900     -0.036   0.061  43  0.033 228  0.021  60  0.023 182  0.001 245  0.007 164  0.035 [illegible]  0.004  51  0.003 357
DCP17     .969     -0.058   0.016  35  0.015 236  0.010  91  0.020 183  0.001 348  0.003 157  0.003 [illegible]  0.003  62  0.003 249
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ  DRIVE HZ   K          MACH NO   DEL.ALPHA  DEL.H     ALPHA.0   TEST POINT  CYCLES ANALYSED
                  0.0       45.61     0.173      0.398     5.42       0.0        9.80    12027.5       20

                V         Q          RN         CM(MIN)   CN(MAX)    ALPHA.NMAX AERO DAMP TDR         EXT DAMP
                 133.9     47100.     0.64E 07  -0.115     1.438      15.00     -0.00084   0.92[illegible] 0.0
                (439.2)   (983.7)                            HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI           RES 8 PHI  RES 9 PHI

ALPHA               9.797   5.425   0  0.331  25  0.178 304  0.066 103  0.031  69  0.021  85  0.020 [illegible]  0.010  83  0.011 258
CN                  0.883   0.439  39  0.129 346  0.032 246  0.016 145  0.012  35  0.035 315  0.028 [illegible]  0.038 242  0.003  69
CM                 -0.011   0.039 224  0.035  76  0.017 340  0.012 268  0.008 203  0.003 120  0.023 [illegible]  0.002  10  0.002 228

DCP 1     .010      4.113   1.344  11  1.318  72  0.460   5  0.031  59  0.198  38  0.118 352  0.052 [illegible]  0.053 336  0.039 300
DCP 2     .020      3.258   0.871  32  0.795  63  0.347   9  0.188 347  0.139 [illegible]  0.092 249  0.052 [illegible]  0.034 291  0.049 319
DCP 3     .030      2.966   0.757  42  0.820  56  0.407 348  0.160 301  0.088 209  0.099 280  0.067 [illegible]  0.033 210  0.041 269
DCP 4     .049      2.776   0.845  37  0.639  39  0.236 323  0.061 294  0.067 293  0.058 234  0.026 [illegible]  0.037 248  0.037 192
DCP 5     .074      2.415   0.757  42  0.521  90  0.190 307  0.051 290  0.077 264  0.059 191  0.041 [illegible]  0.036 227  0.040 159
DCP 6     .099      2.132   0.714  44  0.449  21  0.160 293  0.043 283  0.071 246  0.055 161  0.019 [illegible]  0.023 226  0.022 136
DCP 7     .149      1.646   0.687  39  0.328 358  0.106 268  0.037 267  0.059 201  0.032 109  0.026 [illegible]  0.026 175  0.023  92
DCP 8     .200      1.363   0.629  42  0.266 354  0.081 266  0.038 253  0.050 186  0.022  99  0.025 [illegible]  0.006  35  0.006 105
DCP 9     .250      1.175   0.593  35  0.233 335  0.068 265  0.065 221  0.047 151  0.026  85  0.027 [illegible]  0.019  46  0.013 342
DCP10     .300      1.046   0.546  16  0.207 322  0.076 220  0.041 181  0.040 110  0.021  42  0.013 [illegible]  0.019   0  0.019 315
DCP11     .399      0.866   0.482  40  0.165 320  0.062 222  0.055 182  0.048 106  0.027  42  0.0[illegible]8 [illegible]  0.026 300  0.032 176
DCP12     .501      0.654   0.439  41  0.138 307  0.064 237  0.057 149  0.049  63  0.017 348  0.025 [illegible]  0.024 278  0.002 142
DCP13     .600      0.522   0.342  47  0.123 293  0.060 182  0.049 124  0.044  43  0.021 338  0.018 [illegible]  0.016 250  0.008  84
DCP14     .701      0.442   0.256  52  0.113 278  0.063 157  0.065  98  0.043  18  0.025 296  0.026 [illegible]  0.021 193  0.011  79
DCP15     .800      0.255   0.193  43  0.101 256  0.059 138  0.046  79  0.037 347  0.023 259  0.018 [illegible]  0.016 173  0.013  31
DCP16     .900      0.012   0.130  22  0.082 243  0.031 140  0.041  81  0.034 326  0.009 228  0.015 [illegible]  0.014 154  0.013  46
DCP17     .969     -0.038   0.049  14  0.035 261  0.015 183  0.025  92  0.015 323  0.036 258  0.008 [illegible]  0.010  87  0.008  42
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                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         45.67       0.170       0.405       5.31        0.0         12.23       12029.1     20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                                       0.64E 07   -0.189       1.631       16.60      -0.00127     1.426       0.0
               136.8       48575.
              (448.7)     (1014.5)                                   HARMONIC ANALYSIS
DATA
TYPE     X/C         RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               12.204    5.313   0   0.271  21   0.136  46   0.165 205   0.023 187   0.033  64   0.029 [illegible]   0.027 128   0.017 255
CN                   0.995    0.413  58   0.115   4   0.051 306   0.033 209   0.034 193   0.015 114   0.038 [illegible]   0.006  62   0.004 236
CM                  -0.033    0.075 210   0.034 109   0.019  87   0.016  17   0.013 347   0.006 257   0.003 [illegible]   0.004 214   0.002 148

DCP 1    .010        4.370    0.407 156   0.871 100   0.093 130   0.117 122   0.002 203   0.034 311   0.012 [illegible]   0.031 346   0.013 242
DCP 2    .020        3.360    0.565 126   0.598  99   0.155 108   0.099 116   0.048 203   0.052 214   0.038 [illegible]   0.020 259   0.014 264
DCP 3    .030        3.087    0.665 118   0.569  79   0.072 114   0.112 114   0.045 152   0.043 179   0.053 [illegible]   0.037 242   0.029 227
DCP 4    .049        2.879    0.672  94   0.419  57   0.017  77   0.054 105   0.015 190   0.027 170   0.029 [illegible]   0.027 178   0.024 210
DCP 5    .074        2.513    0.659  89   0.355  48   0.028  82   0.062  95   0.022  55   0.015 119   0.012 [illegible]   0.007 119   0.017 202
DCP 6    .099        2.261    0.650  81   0.318  38   0.017   9   0.054  98   0.035  83   0.035  78   0.023 [illegible]   0.022  37   0.009 295
DCP 7    .149        1.769    0.595  68   0.232  23   0.031  15   0.039  35   0.023 341   0.022  31   0.025 [illegible]   0.025 255   0.023 197
DCP 8    .200        1.500    0.562  63   0.160  25   0.053  55   0.043  48   0.035   1   0.023 328   0.015 [illegible]   0.011  82   0.016  60
DCP 9    .250        1.337    0.615  59   0.246  14   0.141 349   0.094 298   0.059 248   0.034 217   0.013 [illegible]   0.006 237   0.020 210
DCP10    .300        1.178    0.570  55   0.200   7   0.146 342   0.092 277   0.060 239   0.041 201   0.025 [illegible]   0.013 215   0.023 177
DCP11    .399        1.012    0.546  55   0.168 358   0.124 338   0.076 273   0.076 245   0.039 181   0.012 [illegible]   0.019 179   0.019 182
DCP12    .501        0.793    0.480  49   0.138 338   0.097 306   0.070 241   0.084 212   0.043 143   0.021 [illegible]   0.029 115   0.008  72
DCP13    .600        0.656    0.436  47   0.132 315   0.083 284   0.070 215   0.082 190   0.045 104   0.024 [illegible]   0.032  75   0.013  12
DCP14    .701        0.544    0.368  45   0.136 293   0.087 257   0.081 185   0.074 166   0.045  71   0.019 [illegible]   0.033  45   0.019 322
DCP15    .800        0.360    0.312  33   0.133 282   0.096 247   0.081 168   0.066 138   0.034  52   0.022 [illegible]   0.028 347   0.013 294
DCP16    .900        0.068    0.208  21   0.080 290   0.066 239   0.051 161   0.045 110   0.021  21   0.014 [illegible]   0.015 325   0.008 303
DCP17    .969       -0.012    0.350  18   0.038 336   0.031 241   0.025 145   0.014 124   0.015  37   0.035 [illegible]   0.006  16   0.004 324

                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0         44.95       0.169       0.401       5.18        0.0         14.98       12029.2     20

              V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                                       0.64E 07   -0.202       1.613       17.73      -0.00175     1.844       0.0
               135.4       47756.
              (444.1)     (997.4)                                    HARMONIC ANALYSIS
DATA
TYPE     X/C         RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               14.977    5.178   0   0.149  25   0.114  66   0.125 212   0.029 297   0.017  65   0.037 [illegible]   0.014 115   0.013 224
CN                   1.035    0.429  76   0.102  60   0.042  30   0.024 243   0.011 289   0.015 255   0.037 [illegible]   0.008 214   0.004  83
CM                  -0.045    0.091 210   0.025 168   0.024 131   0.016  77   0.003  99   0.034  54   0.032 [illegible]   0.032  30   0.002 299

DCP 1    .010        4.296    1.822 179   0.711 136   0.152 160   0.084 195   0.038 226   0.105   6   0.066 [illegible]   0.042  68   0.061  64
DCP 2    .020        3.304    1.185 160   0.617 136   0.313 167   0.249 201   0.112 222   0.098 304   0.023 [illegible]   0.046  41   0.031 118
DCP 3    .030        3.057    1.236 149   0.439 115   0.342 164   0.180 159   0.162 225   0.079 229   0.077 [illegible]   0.031 265   0.019 331
DCP 4    .049        2.887    1.037 127   0.330  90   0.212 133   0.111 142   0.036 195   0.044 220   0.029 [illegible]   0.025 258   0.005  29
DCP 5    .074        2.532    0.928 116   0.212  87   0.240 122   0.075 131   0.047 163   0.038 206   0.031 [illegible]   0.014 263   0.004 297
DCP 6    .099        2.271    0.847 136   0.164  84   0.225 111   0.063 116   0.018 112   0.026 195   0.015 [illegible]   0.033 233   0.016 201
DCP 7    .149        1.835    0.714  86   0.134  90   0.204  85   0.072  71   0.038   9   0.018 117   0.033 [illegible]   0.013 165   0.007  99
DCP 8    .200        1.558    0.653  84   0.188  95   0.191  73   0.066  77   0.041  16   0.015  75   0.035 [illegible]   0.023 168   0.015  97
DCP 9    .250        1.359    0.620  76   0.180  71   0.139  33   0.018 348   0.027 326   0.016 315   0.037 [illegible]   0.015 197   0.016  68
DCP10    .300        1.223    0.574  70   0.186  62   0.125  19   0.026 355   0.029 324   0.016 324   0.014 [illegible]   0.008 121   0.014  26
DCP11    .399        1.053    0.562  67   0.155  56   0.109  20   0.041 318   0.023 340   0.031 314   0.018 [illegible]   0.010 307   0.009 334
DCP12    .501        0.844    0.514  58   0.119  36   0.092 354   0.052 293   0.017 314   0.034 273   0.020 [illegible]   0.008 221   0.012 209
DCP13    .600        0.708    0.474  53   0.097  18   0.085 329   0.065 276   0.014 283   0.034 259   0.017 [illegible]   0.011 244   0.012 212
DCP14    .701        0.589    0.405  47   0.083 352   0.103 304   0.073 251   0.019 244   0.025 233   0.015 [illegible]   0.013 228   0.017 [illegible]
DCP15    .800        0.410    0.345  36   0.096 346   0.094 293   0.074 235   0.013 216   0.018 205   0.009 [illegible]   0.020 205   0.020  95
DCP16    .900        0.123    0.229  24   0.078 350   0.049 274   0.061 223   0.011 279   0.019 181   0.013 [illegible]   0.007 173   0.011  83
DCP17    .969        0.012    0.106  33   0.051 352   0.020 307   0.041 240   0.011 224   0.015 215   0.036 [illegible]   0.003 115   0.004 175
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H      ALPHA.0     TEST POINT   CYCLES ANALYSED
               0.0         45.64      0.172        0.400        5.30        0.0        17.47      12029.6       20

             V            Q            RN          CM(MIN)     CN(MAX)      ALPHA,NMAX AERO DAMP   TDR          EXT DAMP
             134.9         47521.      0.64E 07   -0.242        1.758       18.48     -0.03225     2.465         0.0
            (442.5)       (992.5)                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI            RES 8 PHI    RES 9 PHI

ALPHA             17.468     5.300   0    0.159 350    0.127 167    0.081 347    0.066  29    0.014  93    0.001 [illegible]    0.007 244    0.001 100
CN                 1.051     0.433  77    0.109  73    0.082  87    0.028  52    0.050  37    0.011  22    0.012 [illegible]    0.039 191    0.032  18
CM                -0.061     0.132 215    0.043 236    0.027 212    0.014 191    0.014 189    0.032 181    0.035 [illegible]    0.039 251    0.001 157

DCP 1     .010     3.852     2.249 105    0.216 227    0.114 224    0.076 219    0.125  71    0.031 166    0.083 [illegible]    0.024 232    0.037 233
DCP 2     .020     3.376     1.542 171    0.316 193    0.316 236    0.086 209    0.114 358    0.051  78    0.097 [illegible]    0.025 265    0.037 223
DCP 3     .030     2.851     1.342 157    0.312 167    0.362 109    0.190 277    0.075 307    0.117 353    0.085 [illegible]    0.031  21    0.016 115
DCP 4     .049     2.855     0.993 191    0.162 244    0.260 175    0.126 254    0.042 236    0.032 354    0.025 [illegible]    0.025 123    0.013  97
DCP 5     .074     2.547     0.868 119    0.161 190    0.211 157    0.135 201    0.023 265    0.063 338    0.024 [illegible]    0.013  43    0.012  85
DCP 6     .099     2.264     0.781 112    0.171 187    0.167 147    0.073 192    0.019  26    0.013 292    0.061 [illegible]    0.011  67    0.016 152
DCP 7     .149     1.814     0.673  86    0.240 145    0.151 137    0.057 143    0.037  97    0.013   3    0.045 [illegible]    0.013  29    0.028 311
DCP 8     .200     1.513     0.607  90    0.206 128    0.121 119    0.060 147    0.046  79    0.013 232    0.016 [illegible]    0.014 321    0.004 312
DCP 9     .250     1.367     0.612  78    0.249 134    0.139 134    0.081 107    0.063  75    0.035 348    0.017 [illegible]    0.018 269    0.011 326
DCP10     .300     1.222     0.572  72    0.222  93    0.154  99    0.063  97    0.083  72    0.011  93    0.011 [illegible]    0.018 196    0.034 243
DCP11     .399     1.085     0.557  67    0.216  73    0.150  93    0.077  86    0.100  77    0.033  92    0.006 [illegible]    0.031 170    0.011 107
DCP12     .501     0.897     0.529  59    0.201  56    0.135  74    0.066  64    0.099  95    0.027  85    0.005 [illegible]    0.036 136    0.013  86
DCP13     .600     0.768     0.536  53    0.189  42    0.129  96    0.067  38    0.097  33    0.031  33    0.020 [illegible]    0.033 102    0.014  32
DCP14     .701     0.624     0.472  49    0.177  23    0.121  92    0.079   0    0.085 350    0.017 335    0.003 [illegible]    0.031  63    0.009 327
DCP15     .800     0.474     0.305  41    0.167  13    0.113  16    0.071 338    0.068 337    0.018 322    0.032 [illegible]    0.017  29    0.038 273
DCP16     .900     0.167     0.246  41    0.136   1    0.066  12    0.044 333    0.042 334    0.014 332    0.020 [illegible]    0.021   5    0.008 242
DCP17     .969     0.062     0.114  48    0.053   0    0.024  13    0.019 316    0.019 322    0.009 241    0.025 [illegible]    0.000 271    0.007  51
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H      ALPHA.0     TEST POINT   CYCLES ANALYSED
               0.0         45.54      0.173        0.399        5.32        0.0        19.87      12029.4       20

             V            Q            RN          CM(MIN)     CN(MAX)      ALPHA,NMAX AERO DAMP   TDR          EXT DAMP
             134.3         47229.      0.64E 07   -0.203        1.494       19.83     -0.03272     2.993         0.0
            (440.5)       (986.4)                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI            RES 8 PHI    RES 9 PHI

ALPHA             19.871     5.322   0    0.204 357    0.080 228    0.007 341    0.029  48    0.015  77    0.049 [illegible]    0.014 161    0.006  61
CN                 1.039     0.368  79    0.353 111    0.037  87    0.037 186    0.036 212    0.039  55    0.031 [illegible]    0.001 263    0.003 136
CM                -0.085     0.091 231    0.022 232    0.016 265    0.002   0    0.003  31    0.003 206    0.032 [illegible]    0.001  93    0.002 301

DCP 1     .010     3.338     1.700 187    0.429 308    0.399   0    0.102  88    0.074 177    0.068 161    0.067 [illegible]    0.023 254    0.013 333
DCP 2     .020     2.863     1.056 170    0.244 288    0.071 311    0.163  48    0.074 165    0.026 111    0.063 [illegible]    0.014 348    0.026 332
DCP 3     .030     2.572     1.002 196    0.351 258    0.038 305    0.118 322    0.088  43    0.029 119    0.062 [illegible]    0.035 157    0.005 167
DCP 4     .049     2.427     0.726 163    0.284 216    0.358 272    0.232 326    0.012 286    0.013 281    0.028 [illegible]    0.022 316    0.013  36
DCP 5     .074     2.139     0.535 117    0.288 196    0.044 280    0.023 273    0.010 195    0.011 236    0.013 [illegible]    0.022 262    0.015 350
DCP 6     .099     1.962     0.495  87    0.261 185    0.055 256    0.011 223    0.035   2    0.038 198    0.013 [illegible]    0.011 165    0.013 336
DCP 7     .149     1.678     0.451  77    0.192 146    0.033 196    0.012 161    0.008  68    0.013 127    0.018 [illegible]    0.011 177    0.003 264
DCP 8     .200     1.464     0.454  79    0.140 136    0.046 163    0.008  82    0.007 310    0.008  80    0.013 [illegible]    0.016 157    0.001 120
DCP 9     .250     1.359     0.445  77    0.126 119    0.058 146    0.019 218    0.012 269    0.022  66    0.082 [illegible]    0.037 151    0.039 197
DCP10     .300     1.245     0.425  74    0.114 103    0.067 128    0.027 216    0.004 217    0.017  39    0.012 [illegible]    0.008  76    0.002 106
DCP11     .399     1.133     0.461  75    0.101  99    0.088 113    0.036 212    0.010 351    0.017  64    0.017 [illegible]    0.019  69    0.006 219
DCP12     .501     0.957     0.462  69    0.392  87    0.375  96    0.031 172    0.017 223    0.016  62    0.011 [illegible]    0.025  27    0.007 186
DCP13     .600     0.811     0.453  63    0.091  69    0.074  79    0.018 170    0.014 242    0.008  76    0.021 [illegible]    0.013 328    0.009 157
DCP14     .701     0.696     0.432  58    0.094  49    0.076  59    0.016  99    0.015 186    0.016  53    0.016 [illegible]    0.019 277    0.013 119
DCP15     .800     0.565     0.372  56    0.377  34    0.065  45    0.037  12    0.015 203    0.013  53    0.019 [illegible]    0.011 246    0.012  90
DCP16     .900     0.240     0.249  57    0.044  38    0.044  35    0.006  29    0.009 136    0.016 325    0.007 [illegible]    0.010 189    0.005  56
DCP17     .969     0.068     0.122  65    0.022  40    0.021  33    0.012 281    0.011 241    0.013   2    0.032 [illegible]    0.013 202    0.006 253
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         49.60        0.186        0.404        5.59         0.0          5.83        12079.1       20

                 V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDA          EXT DAMP
                                             0.69E 07   -0.024        1.077        11.36       -0.00083      0.935        0.0
                  136.2        48926.
                 (446.9)      (1021.8)                                   HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                5.834    5.991   0    0.303   5    0.107 323    0.038 204    0.023  73    0.020  80    0.015 239    0.006 298    0.009 134
CN                   0.711    0.375 358    0.055  17    0.038 104    0.006 287    0.002  51    0.005 224    0.001 160    0.003 340    0.004 101
CM                   0.006    0.026 282    0.002 251    0.001  48    0.001 268    0.001  49    0.001  39    0.000 247    0.001 308    0.001 10(

DCP 1     .013       3.071    2.612 342    0.161 282    0.056 120    0.056 243    0.062 114    0.057  69    0.022 323    0.032 322    0.007 349
DCP 2     .020       2.652    1.893 345    0.134   5    0.034 122    0.013  30    0.063 359    0.043 246    0.038 154    0.027  24    0.016 105
DCP 3     .030       2.549    1.616 345    0.134  17    0.027  73    0.033 269    0.014  57    0.006  65    0.010 178    0.020 343    0.017  96
DCP 4     .049       2.401    1.362 344    0.133  16    0.025  66    0.044 267    0.016  48    0.001 195    0.011 192    0.017 339    0.018 109
DCP 5     .074       2.167    1.059 343    0.120  12    0.028 116    0.038 269    0.018  29    0.008 195    0.010 213    0.021 325    0.019 112
DCP 6     .099       2.022    0.870 344    0.103  15    0.036 113    0.036 266    0.014  44    0.005 233    0.009 223    0.015 338    0.024 115
DCP 7     .149       1.566    0.652 350    0.058   7    0.022 108    0.019 283    0.007  52    0.007 329    0.009 130    0.015 279    0.023  79
DCP 8     .200       1.339    0.524 357    0.046   9    0.037 119    0.035 284    0.024  55    0.007 238    0.010 227    0.006 346    0.021 111
DCP 9     .250       0.823    0.549 358    0.040  16    0.011 348    0.005 353    0.002 276    0.005 210    0.002 315    0.003 281    0.002 278
DCP10     .300       0.711    0.458   0    0.034  20    0.009   1    0.003   0    0.006 227    0.004 237    0.004  46    0.001 101    0.001  77
DCP11     .399       0.593    0.367  11    0.034  20    0.005  49    0.003   7    0.005 226    0.011 223    0.003  95    0.000  54    0.004 323
DCP12     .501       0.459    0.283  16    0.024  36    0.004 102    0.006  46    0.004 242    0.007 232    0.003 307    0.002 108    0.003 166
DCP13     .600       0.394    0.218  27    0.023  47    0.006  94    0.008  41    0.002 132    0.005 204    0.004  34    0.003  82    0.001 257
DCP14     .701       0.373    0.140  35    0.025  37    0.003 130    0.004 114    0.001 129    0.007 212    0.001   0    0.005  89    0.002 224
DCP15     .800       0.191    0.094  49    0.012  28    0.007 137    0.002 139    0.003 243    0.004 233    0.003 146    0.002  53    0.003 326
DCP16     .900      -0.057    0.041  63    0.006   5    0.004 269    0.002 161    0.003 290    0.008 217    0.003 159    0.005 240    0.003 205
DCP17     .969      -0.059    0.024 165    0.006 306    0.008 191    0.003 188    0.005 186    0.004  52    0.003  76    0.004   0    0.005  27

                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                   0.0         49.70        0.187        0.402        5.57         0.0          7.51        12079.2       20

                 V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDA          EXT DAMP
                                             0.66E 07   -0.059        1.273        12.92       -0.00096      1.971        0.0
                  135.1        47923.
                 (443.2)      (1000.9)                                   HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                7.512    5.570   0    0.196   8    0.100 209    0.071 257    0.041  40    0.022  46    0.029 178    0.007 288    0.009 122
CN                   0.773    0.473  18    0.093 330    0.021 167    0.012 328    0.037 164    0.007  66    0.073 355    0.032 295    0.001 199
CM                  -0.002    0.030 282    0.011  52    0.013 271    0.008 196    0.007 336    0.001 113    0.001 315    0.001 296    0.001 104

DCP 1     .013       3.686    2.192 359    0.753  45    0.678 327    0.345 235    0.027  49    0.147 276    0.112 129    0.067  18    0.034 160
DCP 2     .020       2.961    1.875   2    0.470  21    0.284 310    0.148 276    0.133 185    0.106 135    0.062  90    0.079  65    0.072  17
DCP 3     .030       2.827    1.717   1    0.387   8    0.236 293    0.187 208    0.130 135    0.088  76    0.076  12    0.062 318    0.036 300
DCP 4     .049       2.670    1.366   5    0.378   8    0.191 276    0.098 169    0.022  85    0.043 130    0.073  41    0.077 318    0.067 231
DCP 5     .074       2.197    1.135   7    0.312 357    0.161 266    0.108 191    0.045  97    0.012  66    0.062 357    0.066 270    0.031 181
DCP 6     .099       1.956    0.905   9    0.264 341    0.137 219    0.099 110    0.033   7    0.017  73    0.069 329    0.066 233    0.029 133
DCP 7     .149       1.495    0.866   9    0.295 318    0.119 180    0.073  68    0.019 295    0.023  58    0.067 302    0.063 200    0.029 105
DCP 8     .200       1.209    0.696  15    0.146 316    0.085 169    0.069  56    0.008 252    0.026  39    0.042 276    0.029 160    0.017  47
DCP 9     .250       1.262    0.693  12    0.131 299    0.091 146    0.065  20    0.009 267    0.022 316    0.036 206    0.029  87    0.019 354
DCP10     .300       0.913    0.609  15    0.097 294    0.070 132    0.041   1    0.016 232    0.037 270    0.016 167    0.015  42    0.036 255
DCP11     .399       0.750    0.417  26    0.071 305    0.065 127    0.039 351    0.016 213    0.006 317    0.016 167    0.015  48    0.009 269
DCP12     .501       0.569    0.329  33    0.053 335    0.051 116    0.061 332    0.012 217    0.006 193    0.010  98    0.039 356    0.007 192
DCP13     .600       0.453    0.262  45    0.069 312    0.044 171    0.038 315    0.019 166    0.005  69    0.006  84    0.036 292    0.001 335
DCP14     .701       0.388    0.198  64    0.065 321    0.063  94    0.056 307    0.019 137    0.032 173    0.035  62    0.039 282    0.033 176
DCP15     .800       0.187    0.149  66    0.035 273    0.041  81    0.027 293    0.011 120    0.006 232    0.056 353    0.033 245    0.035  27
DCP16     .900      -0.039    0.070  60    0.042 273    0.035  59    0.015 265    0.008 127    0.006  57    0.032 337    0.036 116    0.037 261
DCP17     .969      -0.059    0.019  91    0.021 231    0.019  37    0.037 294    0.031 357    0.033 149    0.031  19    0.036  59    0.034 289
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                           FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNNEL HZ   DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0        49.71       0.189          0.398         5.51         0.0         10.02       12079.3       20

             V           Q            RN            CM(MIN)      CN(MAX)      ALPHA,CNMAX  AERO DAMP    TSR          EXT DAMP
              133.6       47105.      0.44E 07      -0.130         1.520        15.43       -0.00071      0.781        0.0
             (438.4)     (983.8)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              10.029   5.507   0   0.176  19   0.165 324   0.014 250   0.035  85   0.022  28   0.022 182   0.019 316   0.006 172
CN                  0.908   0.475  76   0.116 328   0.026 259   0.031  98   0.020 335   0.003 275   0.013 302   0.011 220   0.009 118
CM                 -0.019   0.066 213   0.061  69   0.019 329   0.019 268   0.008 160   0.002 125   0.009  76   0.006 331   0.006 246

UCP 1    .010       5.876   1.358  10   1.015  76   0.524  19   0.204  95   0.265   1   0.144 310   0.022 306   0.095 334   0.046 297
UCP 2    .020       5.325   1.109  29   0.729  54   0.259   5   0.160  25   0.206 349   0.101 337   0.117 250   0.065 282   0.047 276
UCP 3    .030       2.934   0.786  47   0.923  56   0.487 348   0.181 300   0.114 336   0.141 271   0.129 316   0.069 165   0.034 217
UCP 4    .049       2.781   0.964  58   0.699  33   0.719 110   0.013  17   0.074 296   0.053 213   0.012  11   0.064 256   0.009 186
UCP 5    .074       2.397   0.877  41   0.538  21   0.181 295   0.352 316   0.090 253   0.065 166   0.014   8   0.058 223   0.061 140
UCP 6    .099       2.146   0.814  45   0.447  13   0.163 286   0.036 324   0.082 241   0.053 155   0.021 306   0.056 203   0.058 117
UCP 7    .149       1.667   0.769  39   0.337 351   0.089 255   0.067 296   0.080 208   0.041 115   0.013 229   0.032 126   0.039  39
UCP 8    .200       1.378   0.727  40   0.292 344   0.095 250   0.037 271   0.039 166   0.011  65   0.013 160   0.016  98   0.029  33
UCP 9    .250       1.218   0.689  36   0.261 323   0.073 223   0.066 203   0.053 141   0.056  39   0.071  38   0.028 346   0.029 304
UCP10    .300       1.087   0.665  33   0.237 307   0.086 236   0.053 158   0.061  86   0.019  54   0.033  28   0.033 316   0.025 268
UCP11    .399       0.933   0.587  34   0.199 292   0.076 193   0.069 151   0.069  63   0.012  88   0.065  39   0.056 306   0.036 217
UCP12    .501       0.716   0.490  36   0.165 281   0.071 181   0.080 128   0.069  31   0.008  15   0.037 345   0.050 253   0.035 163
UCP13    .600       0.562   0.388  49   0.136 265   0.073 156   0.084 102   0.064 358   0.016 311   0.033 291   0.038 207   0.035 120
UCP14    .701       0.471   0.256  46   0.123 246   0.076 126   0.068  76   0.056 325   0.016 269   0.073 348   0.033 157   0.036  76
UCP15    .800       0.281   0.221  33   0.118 230   0.055 126   0.062  64   0.069 338   0.013 291   0.028 319   0.033 138   0.033  47
UCP16    .900       0.075   0.151  11   0.085 279   0.063 144   0.058  52   0.037 295   0.009 253   0.011 195   0.025 106   0.023   9
UCP17    .961      -0.062   0.052  12   0.078 248   0.077 177   0.031  51   0.019 296   0.009 267   0.029 206   0.019  87   0.007  86

                           FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNNEL HZ   DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0        49.69       0.191          0.394         5.44         0.0         12.52       12079.4       20

             V           Q            RN            CM(MIN)      CN(MAX)      ALPHA,CNMAX  AERO DAMP    TSR          EXT DAMP
              132.3       46339.      0.43E 07      -0.222         1.786        17.37       -0.00089      0.961        0.0
             (434.1)     (967.8)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              12.523   5.419   0   0.165  29   0.267 356   0.078 158   0.038 153   0.031  27   0.017 215   0.039 327   0.008 219
CN                  1.099   0.692  51   0.127 348   0.053 309   0.028 299   0.092 176   0.026 136   0.016  43   0.013   9   0.006 336
CM                 -0.056   0.085 293   0.043  95   0.026  67   0.018 351   0.012 323   0.010 258   0.006 196   0.006 187   0.003 104

UCP 1    .010       4.563   0.950 129   1.139  97   0.285 101   0.190  79   0.091 130   0.067 116   0.059 101   0.043 196   0.039 103
UCP 2    .020       3.645   0.673  88   0.752  82   0.226  76   0.119  77   0.148  92   0.107  71   0.078  68   0.063  80   0.053  91
UCP 3    .030       3.169   0.697 117   0.916  82   0.266  67   0.165  65   0.159  67   0.087  24   0.086  39   0.086 358   0.051 335
UCP 4    .049       2.978   0.806  99   0.608  55   0.096  44   0.124  91   0.029 355   0.035  63   0.058  19   0.026 329   0.036  31
UCP 5    .074       2.556   0.811  87   0.473  41   0.101  53   0.198   2   0.021 258   0.078  38   0.073 346   0.009 341   0.038  23
UCP 6    .099       2.296   0.782  76   0.375  36   0.141  56   0.192 342   0.020 222   0.033  28   0.044 347   0.048 286   0.021 303
UCP 7    .149       1.867   0.770  60   0.273  13   0.134  26   0.125 310   0.019 267   0.029 286   0.013 269   0.017 316   0.019 303
UCP 8    .200       1.558   0.765  58   0.266  16   0.133   7   0.118 302   0.039 243   0.022 215   0.036 308   0.017 313   0.021 266
UCP 9    .250       1.376   0.715  52   0.233   6   0.164 342   0.120 271   0.066 236   0.027 229   0.042 276   0.016 156   0.011 215
UCP10    .300       1.221   0.655  47   0.193 357   0.163 330   0.177 255   0.058 276   0.043 107   0.037 173   0.015 122   0.025 197
UCP11    .399       1.053   0.692  47   0.158 347   0.167 322   0.096 247   0.073 239   0.079 189   0.041 165   0.025 111   0.022 119
UCP12    .501       0.838   0.568  42   0.148 326   0.125 296   0.086 219   0.080 207   0.085 165   0.052  89   0.030  69   0.032  68
UCP13    .600       0.683   0.519  41   0.153 331   0.111 261   0.073 189   0.077 176   0.083 119   0.058  55   0.041  33   0.033 352
UCP14    .701       0.583   0.428  37   0.170 276   0.138 228   0.085 153   0.073 155   0.079  73   0.053   4   0.032   7   0.017 287
UCP15    .800       0.370   0.366  26   0.165 270   0.113 221   0.082 145   0.070 116   0.062  39   0.036 347   0.028 328   0.026 271
UCP16    .900       0.078   0.275  15   0.096 272   0.077 212   0.055 136   0.057  89   0.038  16   0.031 336   0.027 285   0.019 215
UCP17    .961      -0.321   0.083  15   0.043 288   0.041 276   0.024 143   0.024 158   0.026  28   0.012 286   0.008 287   0.005 206
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNER HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        49.68      0.192        0.393       5.36        0.0        15.10      12079.5      20

             V              Q         RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
            132.0        46228.     0.49E 07    -0.270       1.909       18.58      -0.00147     1.998        0.0
           (433.1)       (965.5)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.098    5.361   0   0.741  21   0.238  42   0.087 290   0.020 234   0.011 134   0.007 282   0.036  87   0.009 208
CN                1.109    0.595  61   0.083  43   0.079  25   0.069 311   0.033 237   0.015 231   0.012 226   0.011 177   0.006 107
CM               -0.058    0.119 203   0.094 137   0.029 119   0.028  89   0.012  71   0.006  99   0.006  22   0.007 350   0.009 289

DCP 1    .010     4.068    1.594 167   0.799 125   0.288 179   0.075 217   0.089 219   0.017 171   0.016  94   0.033  10   0.060 348
DCP 2    .025     3.589    1.091 142   0.608 116   0.296 145   0.147 168   0.148 226   0.115 217   0.063 274   0.066 278   0.037 343
DCP 3    .050     3.152    1.201 143   0.563 109   0.364 142   0.198 115   0.115 197   0.133 166   0.052 209   0.067 185   0.025 297
DCP 4    .049     2.995    1.062 115   0.286  86   0.270 119   0.076  91   0.066 169   0.069 130   0.019 204   0.027 194   0.031 213
DCP 5    .074     2.585    0.967 133   0.203  78   0.257 100   0.066  71   0.053 116   0.028 165   0.039 156   0.038 148   0.022 157
DCP 6    .099     2.313    0.487  96   0.166  92   0.287  88   0.066  69   0.028  71   0.045 147   0.060  87   0.013  71   0.059 187
DCP 7    .149     1.917    0.931  77   0.196  85   0.295  61   0.089  18   0.065  12   0.020  99   0.033  66   0.019  19   0.316 165
DCP 8    .200     1.627    0.763  72   0.189  76   0.236  56   0.092  25   0.031 356   0.065  91   0.023  50   0.026  68   0.017  37
DCP 9    .250     1.466    0.751  66   0.189  68   0.253  76   0.136   2   0.067 312   0.020  47   0.036   4   0.024  19   0.033  71
DCP10    .300     1.308    0.704  58   0.177  62   0.219  76   0.160 349   0.077 287   0.021 345   0.022 332   0.026  26   0.039 343
DCP11    .399     1.166    0.706  55   0.126  50   0.190  28   0.164 352   0.085 331   0.068 322   0.065 304   0.021 329   0.038 297
DCP12    .501     0.960    0.664  46   0.105  16   0.141   0   0.163 325   0.086 276   0.074 277   0.099 265   0.069 255   0.055 226
DCP13    .600     0.778    0.636  42   0.111 342   0.123 324   0.151 296   0.078 232   0.065 263   [illegible] 227   0.051 215   0.059 161
DCP14    .731     0.670    0.560  35   0.127 315   0.133 291   0.155 263   0.089 191   0.069 202   [illegible] 185   0.056 168   0.059 107
DCP15    .800     0.465    0.477  27   0.145 314   0.132 276   0.167 266   0.092 175   [illegible] 162   [illegible] 157   0.037 139   0.036  79
DCP16    .909     0.153    0.396  17   0.159 314   0.067 269   0.092 229   0.063 151   [illegible] 186   0.030 347   0.036 126   0.033  63
DCP17    .969     0.011    0.125  23   0.095 330   0.090 251   0.040 212   0.071 198   0.006 133   0.011 190   0.008 136   0.015  96

                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNER HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        51.68      0.198        0.413       5.66        0.0         4.96      12081.1      20

             V              Q         RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
            139.6        50456.     0.46E 07    -0.339       0.976       10.35      -0.00082     0.037        0.0
           (458.1)      (1053.8)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             4.960    5.660   0   0.126   3   0.168   4   0.018 229   0.033  81   0.016  68   0.039 276   0.017 297   0.012 132
CN                0.586    0.611   1   0.328  17   0.013  37   0.006 359   0.001 236   0.032 229   0.001 346   0.032 358   0.001  80
CM               -0.006    0.029 296   0.003 266   0.011 309   0.001 215   0.000 175   0.001  96   0.001 205   0.001 286   0.000 257

DCP 1    .010     2.480    0.188 342   0.255 270   0.133  42   0.067 197   0.071 133   0.035   3   0.039 282   0.016 209   0.016 197
DCP 2    .025     2.026    0.162 349   0.120   9   0.035   5   0.025  65   0.051 280   0.057 306   0.039 119   0.028 317   0.006 182
DCP 3    .050     1.963    1.077 349   0.112  10   0.083 353   0.027 340   0.015 139   0.094 147   0.038 329   0.012 306   0.001 306
DCP 4    .049     1.860    1.577 349   0.085   0   0.067 349   0.016 257   0.009 166   0.031 216   0.029 267   0.028 312   0.006 173
DCP 5    .074     1.618    1.391 350   0.068   1   0.049 356   0.037 271   0.006 218   0.033 261   0.038 267   0.006 328   0.036 161
DCP 6    .099     1.481    1.398 352   0.066   4   0.038   4   0.039 316   0.006 213   0.005 151   0.037 313   0.036 337   0.002 116
DCP 7    .149     1.096    0.775 353   0.066 356   0.029   3   0.009 312   0.007 267   0.006 295   0.036 275   0.037 316   0.036 357
DCP 8    .200     0.887    0.637   0   0.065  36   0.071  18   0.056 329   0.006 246   0.032 165   0.037 286   0.037 306   0.036 237
DCP 9    .250     0.783    0.556 350   0.039  16   0.033  67   0.037 347   0.001 128   0.006 193   0.008 290   0.009 351   0.006  79
DCP10    .300     0.682    0.466   1   0.033  19   0.019  36   0.007 339   0.003 245   0.002 342   0.008 259   0.002  17   0.001 209
DCP11    .399     0.506    0.357  13   0.027  37   0.017  78   0.005  91   0.037 265   0.003 335   0.005   4   0.026  53   0.033 351
DCP12    .501     0.436    0.279  19   0.026  37   0.013  91   0.008  26   0.001  11   0.025 277   0.009  23   0.005  20   0.026  40
DCP13    .600     0.367    0.212  17   0.025  65   0.008  97   0.007  59   0.001 256   0.037 266   0.008  56   0.003 150   0.005  85
DCP14    .731     0.353    0.143  37   0.023  41   0.038  91   0.005  40   0.033 138   0.002 167   0.096 342   0.002 328   0.007 209
DCP15    .800     0.176    0.386  51   0.017  68   0.138  98   0.002  66   0.001 326   0.007 185   0.033  38   0.005 156   0.032  26
DCP16    .909    -0.037    0.366  68   0.056  39   0.027 178   0.005   7   0.001  66   0.035 206   0.032 358   0.026  66   0.031 129
DCP17    .969    -0.380    0.029 174   0.096 332   0.032 285   0.005   5   0.008 279   0.033 326   0.003 159   0.033 178   0.003 107
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          51.57        0.191       0.409        5.61         0.0          7.47        12081.2       20

          V            Q            RN          CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
           137.7        49585.       0.65E 07   -0.035        1.217        12.88       -0.00095      1.073        0.0
          (451.8)      (1035.6)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                7.467   5.608   0    0.330   4    0.110 348    0.070 257    0.034  74    0.024  76    0.017  23    0.019 337    0.007 126
CN                   0.736   0.416  18    0.077 324    0.028 116    0.014 330    0.009 171    0.006 109    0.006  14    0.005 338    0.004 219
CM                  -0.001   0.030 279    0.012  45    0.014 271    0.005 139    0.001 329    0.000  85    0.001 295    0.001 233    0.001  91

DCP 1     .010       3.120   2.074 354    0.744  40    0.624 328    0.304 233    0.024 340    0.152 213    0.093 115    0.048 318    0.050 160
DCP 2     .020       2.844   1.942   2    0.473  15    0.272 310    0.165 233    0.098 189    0.100 150    0.068  93    0.067  51    0.062   2
DCP 3     .030       2.733   1.706   1    0.363   1    0.193 291    0.141 206    0.090 133    0.066  95    0.070  26    0.060 329    0.036 289
DCP 4     .049       2.368   1.279   5    0.355  10    0.150 289    0.066 183    0.019 145    0.059 123    0.088  28    0.070 307    0.039 221
DCP 5     .074       2.061   1.076   6    0.285 355    0.103 255    0.052 135    0.007 158    0.047  97    0.069 354    0.046 255    0.026 156
DCP 6     .099       1.871   0.948   8    0.246 340    0.093 213    0.051  99    0.004 262    0.040  89    0.058 334    0.040 236    0.025 143
DCP 7     .149       1.428   0.830   8    0.205 316    0.106 175    0.067  59    0.013 299    0.026  38    0.042 286    0.026 192    0.017 126
DCP 8     .200       1.159   0.673  14    0.155 314    0.082 158    0.045  33    0.020 196    0.024  55    0.027 300    0.020 190    0.022 138
DCP 9     .250       1.010   0.587  13    0.123 294    0.084 130    0.051   8    0.009 195    0.017 325    0.021 203    0.015  58    0.007 295
DCP10     .300       0.880   0.501  14    0.099 285    0.093 116    0.048 356    0.013 229    0.006 244    0.014 157    0.018  27    0.007 310
DCP11     .399       0.711   0.402  27    0.073 299    0.072 119    0.032 344    0.010 166    0.010 284    0.015 142    0.019  32    0.008 282
DCP12     .501       0.536   0.329  32    0.053 290    0.064 107    0.033 334    0.012 183    0.001 200    0.011 105    0.015  25    0.010 271
DCP13     .600       0.425   0.262  44    0.046 295    0.057  96    0.031 319    0.016 164    0.006 147    0.005 102    0.005 354    0.006 298
DCP14     .701       0.363   0.200  64    0.038 302    0.044  91    0.024 284    0.012 124    0.001 167    0.011  34    0.001 287    0.003 161
DCP15     .800       0.181   0.145  66    0.024 263    0.043  76    0.024 289    0.009 149    0.007 149    0.008  26    0.005 265    0.006 203
DCP16     .900      -0.041   0.066  42    0.038 210    0.035  54    0.007 226    0.002 148    0.005  61    0.008 353    0.005  92    0.004 277
DCP17     .969      -0.053   0.024  43    0.020 238    0.015  71    0.003 359    0.004 343    0.009 117    0.009 272    0.003 299    0.006 242

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          51.51        0.192       0.406        5.53         0.0          9.97        12081.3       20

          V            Q            RN          CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
           136.4        48823.       0.65E 07   -0.131        1.461        15.40       -0.00067      0.768        0.0
          (447.4)      (1019.7)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                9.972   5.531   0    0.441  18    0.177 327    0.025 269    0.029  76    0.024  11    0.032 172    0.017 292    0.007 135
CN                   0.868   0.465  36    0.114 326    0.020 199    0.026 111    0.017 341    0.004  17    0.012 282    0.005 184    0.002  66
CM                  -0.017   0.044 214    0.040  58    0.019 321    0.014 269    0.009 157    0.002 165    0.004  71    0.004 305    0.003 185

DCP 1     .010       3.821   1.986  11    0.942  71    0.487  16    0.130  24    0.193   7    0.106 313    0.033 313    0.054 313    0.029 295
DCP 2     .020       3.183   1.124  29    0.678  50    0.236   2    0.133  23    0.168 344    0.140 299    0.094 255    0.049 252    0.048 239
DCP 3     .030       2.804   0.797  44    0.838  55    0.425 350    0.159 301    0.104 297    0.111 257    0.088 203    0.037 176    0.042 187
DCP 4     .049       2.667   0.944  38    0.588  29    0.174 311    0.024 348    0.062 287    0.037 212    0.010 289    0.057 225    0.057 147
DCP 5     .074       2.777   0.862  40    0.491  18    0.129 300    0.054 327    0.084 246    0.049 154    0.016 321    0.034 210    0.041 120
DCP 6     .099       2.050   0.908  42    0.418   8    0.103 287    0.054 328    0.085 234    0.043 142    0.009 258    0.023 159    0.024  97
DCP 7     .149       1.592   0.770  38    0.345 348    0.098 255    0.034 250    0.054 190    0.021 112    0.023 161    0.038  85    0.029  36
DCP 8     .200       1.319   0.711  40    0.282 343    0.086 256    0.048 225    0.051 165    0.020  90    0.011 161    0.025  62    0.014  18
DCP 9     .250       1.165   0.671  35    0.257 324    0.079 232    0.057 203    0.061 136    0.044  61    0.022   2    0.022 350    0.028 309
DCP10     .300       1.048   0.623  31    0.215 308    0.066 214    0.067 177    0.048  91    0.016  51    0.027  38    0.036 326    0.027 247
DCP11     .399       0.892   0.569  34    0.177 297    0.059 204    0.075 165    0.053  73    0.014  52    0.045  19    0.044 298    0.030 211
DCP12     .501       0.676   0.462  36    0.146 294    0.065 184    0.087 130    0.063  24    0.008 336    0.034 328    0.037 251    0.032 159
DCP13     .600       0.534   0.381  40    0.135 266    0.072 156    0.083 109    0.070 351    0.011  16    0.044 294    0.046 185    0.026  95
DCP14     .701       0.450   0.290  45    0.128 246    0.095 118    0.064  66    0.057 315    0.008 344    0.043 246    0.037 132    0.029  23
DCP15     .800       0.263   0.221  34    0.127 231    0.074 109    0.051  58    0.036 301    0.015 335    0.042 220    0.031  96    0.025 349
DCP16     .900       0.014   0.137  15    0.088 224    0.047 139    0.056  41    0.035 291    0.014 264    0.019 168    0.020  67    0.022 339
DCP17     .969      -0.028   0.060   4    0.045 246    0.016 153    0.033  80    0.025 305    0.003 313    0.008 201    0.013 107    0.008 345
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                               FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                   TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                    0.0         51.64       0.194       0.403       5.47        0.0         12.51       12081.4      20

                   V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                    135.4       48263.      0.64E 07   -0.221       1.724       17.38      -0.00074     0.822       0.0
                   (444.2)     (1008.0)                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              12.513     5.467   0   0.417  31   0.336 350   0.069 126   0.044 122   0.039  34   0.033 214   0.030 268   0.009 220
CN                  0.999     0.502  47   0.101 354   0.053 315   0.025 217   0.028 156   0.017  86   0.010  70   0.011  14   0.006 305
CM                 -0.037     0.088 201   0.045  88   0.022  53   0.018 339   0.012 298   0.009 241   0.005 196   0.005 156   0.004  87

DCP 1     .010      4.017     0.446 125   1.180  93   0.220  94   0.191  71   0.068 174   0.031 145   0.043 180   0.007 131   0.039 201
DCP 2     .020      3.438     0.627  90   0.801  87   0.269  64   0.124  49   0.107  91   0.059  56   0.026 123   0.019  94   0.016 261
DCP 3     .030      3.048     0.669 110   0.886  81   0.276  39   0.129  48   0.108  51   0.052   8   0.030  92   0.037  35   0.003 348
DCP 4     .049      2.849     0.804  85   0.555  53   0.089  46   0.107  33   0.025  49   0.037  58   0.037  42   0.014 351   0.017  19
DCP 5     .074      2.466     0.808  77   0.432  40   0.105  49   0.130   7   0.036 316   0.003 305   0.032  40   0.010 335   0.014  10
DCP 6     .099      2.227     0.793  70   0.338  31   0.119  54   0.130 358   0.044 319   0.030 309   0.014 341   0.012 252   0.003 261
DCP 7     .149      1.792     0.774  57   0.257  19   0.141  13   0.109 313   0.026 276   0.025 297   0.023 311   0.012 194   0.009 317
DCP 8     .200      1.497     0.721  55   0.232  20   0.162 359   0.092 293   0.015 305   0.036 287   0.023 248   0.004 303   0.019 263
DCP 9     .250      1.327     0.729  48   0.219   3   0.195 337   0.123 264   0.056 232   0.027 234   0.051 207   0.036 170   0.025 124
DCP10     .300      1.185     0.660  44   0.172 357   0.180 331   0.115 258   0.075 216   0.043 179   0.040 165   0.029 124   0.031  96
DCP11     .399      1.028     0.647  44   0.141 341   0.148 331   0.108 256   0.086 219   0.061 163   0.041 142   0.036 101   0.033  76
DCP12     .501      0.812     0.585  40   0.135 315   0.119 299   0.092 220   0.080 182   0.060 131   0.054 100   0.051  49   0.032   5
DCP13     .600      0.667     0.533  38   0.154 292   0.107 264   0.094 185   0.089 154   0.066  94   0.056  69   0.066  16   0.044 312
DCP14     .701      0.570     0.445  35   0.182 272   0.106 224   0.104 150   0.084 113   0.062  56   0.049  14   0.044 318   0.043 274
DCP15     .800      0.367     0.370  24   0.183 261   0.113 203   0.097 126   0.070  82   0.058  20   0.036 328   0.032 280   0.021 218
DCP16     .900      0.084     0.240   8   0.098 256   0.075 197   0.063 108   0.048  62   0.025  18   0.027 310   0.027 285   0.030 206
DCP17     .969     -0.009     0.099   9   0.044 282   0.028 204   0.031 124   0.027  59   0.027   1   0.013 270   0.001 112   0.005   3

                               FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                   TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                    0.0         51.73       0.196       0.400       5.38        0.0         15.07       12081.5      20

                   V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                    134.3       47665.      0.64E 07   -0.266       1.866       18.61      -0.00107     1.197       0.0
                   (440.8)     (995.5)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              15.071     5.376   0   0.284  27   0.312  22   0.078 188   0.023 196   0.029  73   0.025 282   0.022   9   0.016 198
CN                  1.078     0.547  55   0.068  31   0.072   8   0.049 305   0.023 273   0.017 259   0.015 208   0.010 165   0.010  69
CM                 -0.063     0.121 199   0.038 128   0.030 132   0.021  62   0.010 350   0.006  53   0.005 354   0.006 318   0.007 238

DCP 1     .010      3.754     1.478 159   0.760 127   0.208 180   0.095 176   0.034 249   0.014 247   0.017  29   0.034 330   0.025 259
DCP 2     .020      3.417     1.077 134   0.591 110   0.248 135   0.152 140   0.090 207   0.072 200   0.041 220   0.021 315   0.047 293
DCP 3     .030      3.040     1.103 137   0.563 108   0.297 129   0.161  94   0.092 188   0.087 140   0.040 173   0.036 151   0.018 212
DCP 4     .049      2.912     1.005 109   0.301  90   0.236 103   0.076  65   0.029 158   0.025 177   0.044 191   0.034 172   0.027 178
DCP 5     .074      2.530     0.955  95   0.187  77   0.215  88   0.046  72   0.043 111   0.033 115   0.027 141   0.024 139   0.023 109
DCP 6     .099      2.280     0.907  98   0.153  87   0.256  72   0.048  26   0.023  87   0.030  93   0.011 104   0.018  64   0.014  93
DCP 7     .149      1.870     0.846  69   0.148  85   0.268  51   0.076  14   0.030  12   0.036  19   0.015 204   0.011  83   0.019 107
DCP 8     .200      1.586     0.769  67   0.171  79   0.210  44   0.071  11   0.020 349   0.020   0   0.006 110   0.011 331   0.011   4
DCP 9     .250      1.400     0.752  61   0.180  63   0.245  25   0.146 354   0.071 307   0.029 353   0.036 349   0.042 323   0.031 300
DCP10     .300      1.261     0.689  55   0.165  60   0.215  20   0.153 350   0.070 297   0.048 325   0.032 313   0.035 309   0.027 293
DCP11     .399      1.118     0.693  50   0.114  45   0.176  22   0.166 347   0.084 289   0.060 308   0.053 289   0.029 286   0.031 272
DCP12     .501      0.927     0.683  43   0.098   0   0.131 357   0.149 320   0.081 259   0.072 270   0.055 238   0.042 227   0.035 172
DCP13     .600      0.781     0.651  37   0.124 326   0.127 316   0.129 284   0.080 226   0.077 241   0.063 205   0.062 182   0.062 123
DCP14     .701      0.670     0.578  32   0.153 311   0.164 279   0.144 238   0.091 173   0.067 195   0.053 156   0.042 132   0.058  73
DCP15     .800      0.464     0.497  23   0.167 304   0.167 261   0.143 208   0.078 142   0.060 146   0.038 105   0.034  91   0.045  24
DCP16     .900      0.150     0.309  12   0.118 297   0.083 238   0.083 189   0.056 106   0.003 111   0.019 126   0.038  97   0.044  10
DCP17     .969      0.020     0.141  15   0.062 301   0.042 231   0.041 182   0.033  97   0.005 320   0.007 243   0.023 136   0.010  96
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL      NLR 1

                TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H         ALPHA.0      TEST POINT  CYCLES ANALYSED
                  0.0         52.47        0.191       0.414        5.65         0.0            4.98       12083.1       20

                V            Q            RN          CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                 139.9        50696.       0.66E 07   -0.038        0.962        10.47       -0.00077      0.891        0.0
                (458.9)      (1058.8)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.577    5.653   0    0.316   4    0.171 357    0.033 219    0.023  62    0.025  62    0.026 245    0.014 299    0.012  97
CN                  0.581    0.400   1    0.028  17    0.010  43    0.003 316    0.001 179    0.002  87    0.002 347    0.004 343    0.001 228
CM                 -0.007    0.029 301    0.003 259    0.003 320    0.002 235    0.001  97    0.001 240    0.001 176    0.001 200    0.001  51

DCP 1    .010       2.546    3.133 342    0.242 279    0.013  30    0.079 224    0.074 107    0.030   9    0.017 275    0.021 265    0.006 270
DCP 2    .020       2.012    2.137 349    0.134  10    0.067   2    0.011  21    0.036 317    0.055 217    0.036 125    0.018 331    0.004  65
DCP 3    .030       1.558    1.861 348    0.121   7    0.073 351    0.028 255    0.012 134    0.031 127    0.006 196    0.013 310    0.003  17
DCP 4    .049       1.834    1.560 349    0.094   3    0.058 354    0.022 258    0.008 139    0.002 123    0.005 180    0.002  17    0.002  78
DCP 5    .074       1.602    1.235 350    0.077   2    0.042 359    0.017 254    0.004 114    0.007 175    0.000 139    0.002 220    0.004 231
DCP 6    .099       1.472    1.025 352    0.073   7    0.033  10    0.015 263    0.009 132    0.004 172    0.006  76    0.004 262    0.002 109
DCP 7    .149       1.086    0.771 353    0.051   4    0.028 356    0.010 281    0.007 207    0.007 256    0.006 272    0.005 288    0.004  31
DCP 8    .200       0.882    0.626   0    0.042  23    0.022  31    0.012 303    0.003 230    0.001 268    0.004 341    0.003 245    0.002 351
DCP 9    .250       0.781    0.521 359    0.037  18    0.020  37    0.005 317    0.003 182    0.004  46    0.006 291    0.006 313    0.003 352
DCP10    .300       0.677    0.433   0    0.029  19    0.011  38    0.003 312    0.004 236    0.003  98    0.003 313    0.009 317    0.002 102
DCP11    .399       0.562    0.346  13    0.029  38    0.013  90    0.004 324    0.001 212    0.004 110    0.003  26    0.007 359    0.004  64
DCP12    .501       0.435    0.267  19    0.024  48    0.011  91    0.004  70    0.002 320    0.004 181    0.003   1    0.005   0    0.003 183
DCP13    .600       0.368    0.204  27    0.024  48    0.009 116    0.006  47    0.002  67    0.004  44    0.004 353    0.005 341    0.002 180
DCP14    .701       0.355    0.133  38    0.022  47    0.011  99    0.006  30    0.004 244    0.003  85    0.003   0    0.004  18    0.002 315
DCP15    .800       0.180    0.093  55    0.014  37    0.012 147    0.006  27    0.003 249    0.002 357    0.004   0    0.005  16    0.005 233
DCP16    .900      -0.056    0.038  91    0.009 345    0.003 176    0.006  64    0.003 345    0.009  83    0.003 313    0.005  42    0.007 264
DCP17    .965      -0.058    0.026 168    0.010 208    0.005 154    0.004 158    0.003 183    0.010  33    0.003 120    0.005  16    0.005 175
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL      NLR 1

                TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H         ALPHA.0      TEST POINT  CYCLES ANALYSED
                  0.0         52.81        0.195       0.411        5.62         0.0            7.48       12083.2       20

                V            Q            RN          CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                 138.2        49843.       0.65E 07   -0.036        1.192        12.91       -0.00097      1.103        0.0
                (453.4)      (1041.0)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.478    5.618   0    0.377   3    0.142 339    0.051 271    0.036  75    0.019  54    0.005 160    0.017 303    0.013 114
CN                  0.738    0.403  18    0.068 324    0.022 107    0.010 332    0.007 179    0.005  94    0.004   3    0.002  50    0.004 145
CM                 -0.001    0.032 282    0.010  46    0.013 263    0.005 125    0.001 335    0.001 324    0.002 244    0.002 208    0.001  21

DCP 1    .010       3.296    2.053 352    0.631  39    0.507 319    0.185 211    0.054 314    0.137 184    0.096  69    0.034 260    0.041 101
DCP 2    .020       2.951    1.798   2    0.426  15    0.240 304    0.118 218    0.073 178    0.080 125    0.055  64    0.054   0    0.047 311
DCP 3    .030       2.746    1.687   0    0.324 358    0.172 286    0.112 188    0.069 120    0.056  66    0.054 332    0.039 253    0.021 207
DCP 4    .049       2.380    1.268   4    0.322   8    0.141 282    0.061 170    0.023 161    0.049  89    0.060 333    0.049 240    0.020 158
DCP 5    .074       2.064    1.068   6    0.261 351    0.106 241    0.066 114    0.015   0    0.025  53    0.048 302    0.052 195    0.032  90
DCP 6    .099       1.861    0.910   8    0.223 342    0.096 216    0.062  95    0.016 310    0.022  86    0.037 304    0.040 197    0.031  96
DCP 7    .145       1.419    0.787   8    0.160 319    0.070 167    0.047  40    0.018 232    0.021  58    0.025 270    0.019 158    0.009  44
DCP 8    .200       1.160    0.655  14    0.130 312    0.058 162    0.028  63    0.009 142    0.016 339    0.029 223    0.020  97    0.006   1
DCP 9    .250       1.018    0.576  12    0.109 291    0.077 121    0.050   6    0.004 188    0.013 321    0.022 187    0.021  52    0.003 281
DCP10    .300       0.878    0.489  15    0.088 289    0.063 113    0.035 356    0.011 194    0.011 298    0.014 191    0.018  49    0.004 290
DCP11    .399       0.715    0.397  26    0.062 291    0.060 107    0.030 339    0.011 208    0.004 337    0.009 130    0.012  25    0.003 167
DCP12    .501       0.534    0.315  34    0.049 293    0.060  96    0.030 327    0.013 213    0.004 142    0.012  82    0.007 353    0.008 160
DCP13    .600       0.425    0.252  47    0.041 297    0.056  90    0.030 318    0.012 172    0.006 121    0.016  60    0.008 343    0.012 166
DCP14    .701       0.369    0.201  66    0.031 311    0.039  78    0.023 294    0.009 128    0.008 193    0.014  67    0.009 353    0.003 145
DCP15    .800       0.187    0.144  68    0.023 263    0.039  66    0.022 269    0.009 123    0.005 171    0.014  26    0.004  37    0.006 179
DCP16    .900      -0.049    0.072  57    0.029 220    0.025  53    0.007 249    0.006 124    0.013  75    0.007 332    0.006 109    0.007 235
DCP17    .969      -0.057    0.017  52    0.020 225    0.012  35    0.009 217    0.005 269    0.012 120    0.007 275    0.001 107    0.001 291
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                                   FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   0.0         52.78        0.197        0.406        5.55         0.0          10.51       12083.3       20

                 V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                  136.7        48996.       0.65E 07    -0.126        1.416        16.01       -0.00053      0.600        0.0
                 (448.4)      (1023.3)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             10.508   5.548   0   0.373  17   0.245 313   0.030 111   0.016  73   0.036  39   0.028 167   0.001  21   0.012 186
CN                 0.870   0.454  38   0.094 329   0.012 203   0.025  97   0.013 329   0.007  20   0.011 262   0.008 177   0.003  72
CM                -0.017   0.045 206   0.038  55   0.015 321   0.013 267   0.007 141   0.002 185   0.004  42   0.003 282   0.001 176

DCP 1    .010      3.813   0.862  21   0.985  75   0.371  21   0.141  34   0.088  27   0.045 358   0.030  38   0.012 266   0.017  57
DCP 2    .020      3.211   0.970  39   0.701  59   0.235  10   0.121  22   0.098   1   0.080 330   0.031 294   0.017 257   0.012  13
DCP 3    .030      2.841   0.759  57   0.835  57   0.355 353   0.116 329   0.074 328   0.071 294   0.039 251   0.031 222   0.008 136
DCP 4    .049      2.665   0.882  47   0.569  35   0.152 322   0.056 353   0.046 284   0.023 250   0.006 279   0.020 258   0.014 272
DCP 5    .074      2.287   0.825  49   0.476  23   0.113 309   0.062 336   0.048 252   0.019 204   0.001 170   0.019 227   0.003 175
DCP 6    .099      2.052   0.784  50   0.401  13   0.086 300   0.058 324   0.049 226   0.013 181   0.015 191   0.014 151   0.012 330
DCP 7    .149      1.630   0.788  42   0.325 351   0.082 279   0.060 271   0.059 206   0.022 152   0.012 161   0.018 122   0.008  64
DCP 8    .200      1.350   0.707  44   0.263 349   0.071 286   0.048 256   0.041 202   0.017 190   0.015 154   0.013 169   0.021  89
DCP 9    .250      1.166   0.682  35   0.233 319   0.062 230   0.058 202   0.063 129   0.034  59   0.018  35   0.022 326   0.016 285
DCP10    .300      1.035   0.615  31   0.192 304   0.055 215   0.066 176   0.057  94   0.031  31   0.028 339   0.032 270   0.023 188
DCP11    .399      0.868   0.557  36   0.174 296   0.058 208   0.074 154   0.042  69   0.023  51   0.038 345   0.042 255   0.032 160
DCP12    .501      0.669   0.463  36   0.146 280   0.064 185   0.092 117   0.054   3   0.017  56   0.043 302   0.041 194   0.025  83
DCP13    .600      0.538   0.383  38   0.133 260   0.064 149   0.077  95   0.056 336   0.015   5   0.049 259   0.043 150   0.032  38
DCP14    .701      0.452   0.287  43   0.118 237   0.062 123   0.063  73   0.053 312   0.017 335   0.040 213   0.039  93   0.023 337
DCP15    .800      0.274   0.216  29   0.115 219   0.052 110   0.060  57   0.036 299   0.010 287   0.029 186   0.018  81   0.011 303
DCP16    .900      0.018   0.141   8   0.082 213   0.038 107   0.036  34   0.024 258   0.006 198   0.015 132   0.020  30   0.011 238
DCP17    .969     -0.045   0.045  16   0.029 235   0.017 135   0.019  41   0.013 261   0.002 205   0.016 141   0.013  13   0.005 210

                                   FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                   0.0         52.78        0.197        0.405        5.36         0.0          12.53       12083.4       20

                 V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
                  136.1        48737.       0.65E 07    -0.214        1.656        17.50       -0.00057      0.639        0.0
                 (446.6)      (1017.9)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             12.525   5.359   0   0.379  32   0.303 325   0.058 119   0.022  71   0.030  10   0.037 149   0.012 215   0.019 163
CN                 0.992   0.495  46   0.092 353   0.049 299   0.027 184   0.015 106   0.008  70   0.010  27   0.008 310   0.004 201
CM                -0.038   0.084 197   0.043  81   0.023  40   0.017 317   0.008 233   0.002 175   0.004 160   0.005  85   0.004 333

DCP 1    .010      3.973   0.471 110   1.101  92   0.235  95   0.135  76   0.067 156   0.070  95   0.031  20   0.041 261   0.013 215
DCP 2    .020      3.383   0.692  87   0.770  82   0.194  60   0.090  78   0.101 103   0.074  78   0.022  59   0.006 205   0.011 305
DCP 3    .030      2.995   0.715 106   0.874  78   0.253  36   0.115  44   0.083  46   0.055  35   0.022  25   0.005  47   0.010 276
DCP 4    .049      2.825   0.818  82   0.562  53   0.112  31   0.103  11   0.007 349   0.029  29   0.014 330   0.011 311   0.028 226
DCP 5    .074      2.446   0.822  74   0.421  39   0.113  39   0.123 352   0.021 296   0.025 348   0.012 280   0.015 139   0.016 108
DCP 6    .099      2.193   0.804  70   0.341  33   0.126  33   0.104 339   0.019 302   0.005  44   0.023  23   0.006 295   0.009  87
DCP 7    .149      1.766   0.809  55   0.253   9   0.145   5   0.123 301   0.051 254   0.029 214   0.005 185   0.010 101   0.016 316
DCP 8    .200      1.482   0.761  55   0.234  14   0.158 358   0.106 295   0.033 238   0.015 231   0.006  72   0.013 336   0.016 265
DCP 9    .250      1.324   0.699  48   0.203   4   0.177 325   0.114 239   0.041 194   0.022 149   0.019 169   0.028 118   0.016  53
DCP10    .300      1.190   0.638  43   0.175 359   0.170 314   0.103 225   0.040 192   0.030 158   0.032 144   0.038  94   0.028  22
DCP11    .399      1.013   0.600  43   0.130 342   0.138 308   0.097 218   0.054 174   0.034 117   0.031 108   0.046  42   0.026 325
DCP12    .501      0.814   0.566  38   0.129 308   0.116 282   0.105 195   0.067 134   0.035  80   0.044  62   0.051 345   0.033 256
DCP13    .600      0.670   0.523  35   0.154 285   0.098 251   0.100 168   0.067 108   0.037  54   0.049  28   0.055 310   0.033 220
DCP14    .701      0.570   0.433  32   0.170 265   0.105 216   0.096 126   0.057  47   0.026 346   0.034 331   0.041 250   0.027 167
DCP15    .800      0.374   0.368  19   0.171 253   0.116 192   0.102 104   0.063  21   0.032 316   0.034 293   0.038 223   0.029 124
DCP16    .900      0.078   0.229   8   0.090 244   0.071 180   0.054  76   0.040 352   0.012 255   0.017 285   0.024 204   0.025  95
DCP17    .969     -0.017   0.092   7   0.038 267   0.032 183   0.026  83   0.017  14   0.006 205   0.013 312   0.011 248   0.012 147
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                                   FORCED  PITCHING  OSCILLATION               AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ      K              MACH NO       DEL.ALPHA    DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
                  0.0         52.80         0.199          0.402          5.38        0.0            15.10         12083.5        20

                V            Q             RN             CM(MIN)       CN(MAX)      ALPHA,NMAX     AERO DAMP      TDR          EXT DAMP
                134.9        48038.         0.66E 07      -0.264         1.862        18.62          -0.00101        1.123        0.0
                (442.6)      (1003.3)                                                HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              15.995    5.376   0    0.241  40    0.335  22    0.092 165    0.034 230    0.031  80    0.043 247    0.016  30    0.027 192
CN                  1.081    0.543  65    0.073  40    0.048   2    0.059 282    0.019 205    0.017 210    0.006 192    0.009 172    0.003 345
CM                 -0.061    0.119 198    0.036 123    0.030 103    0.021  49    0.006 330    0.006  21    0.003 302    0.005 289    0.005 177

DCP 1    .010       3.913    1.475 160    0.721 120    0.199 166    0.073 254    0.118 218    0.024  67    0.027 219    0.034 259    0.020 253
DCP 2    .020       3.448    1.037 132    0.599 108    0.221 120    0.066 177    0.145 198    0.070 173    0.055 253    0.040 260    0.076 298
DCP 3    .030       2.993    1.154 138    0.561 103    0.318 128    0.136  84    0.116 166    0.101 119    0.046 161    0.032 139    0.040 224
DCP 4    .049       2.889    1.002 108    0.280  87    0.242 105    0.065  53    0.057 137    0.035  92    0.009 141    0.017 298    0.044 231
DCP 5    .074       2.517    0.950  95    0.204  77    0.233  86    0.048  73    0.046 112    0.018 129    0.017 145    0.015 117    0.034 141
DCP 6    .099       2.266    0.904  87    0.182  79    0.238  68    0.041   0    0.025  89    0.042 123    0.025  56    0.012 248    0.030 147
DCP 7    .149       1.851    0.835  71    0.186  81    0.274  40    0.071 336    0.021 351    0.016  26    0.017 310    0.017 296    0.012 175
DCP 8    .200       1.582    0.796  67    0.205  71    0.265  33    0.097 347    0.026 349    0.043  35    0.029 337    0.009 263    0.013  74
DCP 9    .250       1.472    0.765  58    0.183  65    0.267  21    0.137 332    0.059 294    0.031 309    0.039 308    0.036 275    0.036 262
DCP10    .300       1.282    0.699 [illegible]    0.171  58    0.241   9    0.138 318    0.068 274    0.041 258    0.019 266    0.033 258    0.019 253
DCP11    .399       1.128    0.695  50    0.119  53    0.203  14    0.157 326    0.070 273    0.052 276    0.030 265    0.038 258    0.011 217
DCP12    .501       0.922    0.661  43    0.091  15    0.161 349    0.143 292    0.052 240    0.064 243    0.042 200    0.046 185    0.029 122
DCP13    .600       0.776    0.640  37    0.106 327    0.141 315    0.138 259    0.054 201    0.068 212    0.044 165    0.052 147    0.041  67
DCP14    .701       0.677    0.570  33    0.142 306    0.168 279    0.133 225    0.062 157    0.054 168    0.032 112    0.045 104    0.033 359
DCP15    .800       0.469    0.496  22    0.153 303    0.153 256    0.119 200    0.063 129    0.034 117    0.021  65    0.033  70    0.035 333
DCP16    .900       0.152    0.298  12    0.099 288    0.070 235    0.065 180    0.034  79    0.011 147    0.017  45    0.019  23    0.026 306
DCP17    .965       0.028    0.142  12    0.065 291    0.041 221    0.050 161    0.028  78    0.015 340    0.013 308    0.014 106    0.002 309


                                   FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                TUNED HZ     DRIVE HZ      K              MACH NO       DEL.ALPHA    DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
                  0.0         53.38         0.192          0.419          5.68        0.0             4.96         12085.1        20

                V            Q             RN             CM(MIN)       CN(MAX)      ALPHA,NMAX     AERO DAMP      TDR          EXT DAMP
                141.8        51921.         0.66E 07      -0.038         0.951        10.59          -0.00076        0.992        0.0
                (465.1)      (1084.4)                                                HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.960    5.678   0    0.345   3    0.173 350    0.030 200    0.024  62    0.012  26    0.020 116    0.017 255    0.019 111
CN                  0.568    0.397   1    0.027  17    0.012  22    0.001   9    0.001 240    0.002 287    0.002 297    0.003   5    0.001  98
CM                 -0.037    0.028 298    0.003 254    0.002 325    0.001 211    0.000 128    0.001 131    0.001 152    0.001 206    0.000 285

DCP 1    .010       2.536    3.059 342    0.259 276    0.036  25    0.027 238    0.068  98    0.036 249    0.007 273    0.017 282    0.009 268
DCP 2    .020       1.964    2.105 349    0.129   9    0.079 353    0.027  68    0.045 320    0.054 217    0.037 132    0.016   6    0.006 346
DCP 3    .030       1.912    1.831 349    0.119  11    0.083 351    0.016 226    0.013 135    0.003  34    0.006 211    0.005 298    0.001 115
DCP 4    .049       1.793    1.531 349    0.091   5    0.070 349    0.017 215    0.008 147    0.004 132    0.006 212    0.004 242    0.002 127
DCP 5    .074       1.570    1.218 350    0.073   1    0.048 353    0.009 234    0.002 128    0.007  83    0.004 263    0.002  92    0.002  70
DCP 6    .099       1.435    1.010 352    0.069   7    0.039 358    0.008 215    0.002 285    0.003 139    0.001 219    0.002 315    0.002  27
DCP 7    .149       1.060    0.759 353    0.043   6    0.031   6    0.007 184    0.003 253    0.005 287    0.007 169    0.006 233    0.003 136
DCP 8    .200       0.861    0.618   0    0.039  22    0.019  36    0.003 319    0.003 351    0.005 145    0.006 280    0.007 347    0.002  49
DCP 9    .250       0.759    0.514 359    0.034  11    0.021  34    0.004  33    0.001 142    0.008 217    0.006 296    0.002 237    0.001 284
DCP10    .300       0.662    0.437   9    0.031  19    0.017  16    0.006 353    0.005 272    0.003 242    0.005 164    0.002 312    0.001 236
DCP11    .399       0.548    0.347  13    0.028  38    0.012  45    0.003 358    0.002 317    0.006 312    0.005 307    0.007  37    0.001 244
DCP12    .501       0.425    0.264  19    0.025  39    0.011  71    0.003  64    0.002 315    0.004 324    0.006 309    0.008  27    0.004  89
DCP13    .600       0.363    0.209  28    0.023  40    0.009  83    0.004  44    0.002  39    0.005 301    0.006 347    0.006  20    0.005 147
DCP14    .701       0.346    0.142  39    0.019  47    0.007 132    0.002  17    0.005   4    0.006 319    0.005 349    0.006 359    0.003  23
DCP15    .800       0.174    0.093  53    0.015  50    0.006 157    0.003  30    0.001 139    0.002 119    0.001  12    0.002  35    0.002  48
DCP16    .900      -0.054    0.040  73    0.005  58    0.003 238    0.003  40    0.006 240    0.006 311    0.003 296    0.003 212    0.004 144
DCP17    .969      -0.061    0.019 145    0.006 329    0.005 144    0.006  21    0.002 319    0.004 275    0.001 274    0.005  34    0.005 277
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ      K             MACH NO       DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT   CYCLES ANALYSED
                 0.0      53.85         0.196         0.415         5.67        0.0          7.47       12085.2       20

               V          Q              RN            CN(MIN)       CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                139.8     50988.         0.66E 07     -0.039         1.172       13.11      -0.00096     1.193        0.0
               (458.6)   (1064.9)
                                                                 HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                7.474   5.671   0   0.367   6   0.152 319   0.029 229   0.031  61   0.028  55   0.015 161   0.013 290   0.016 149
CN                   0.718   0.605  19   0.066 325   0.024 115   0.009 328   0.006 177   0.002 110   0.004 333   0.001 172   0.005 115
CM                  -0.002   0.032 279   0.009  43   0.013 272   0.004 116   0.001 332   0.001  16   0.001 207   0.001 202   0.001 352

DCP 1      .010      2.793   1.969 353   0.654  39   0.566 317   0.216 214   0.017 325   0.110 175   0.077  65   0.043 245   0.052 110
DCP 2      .020      2.774   1.765   2   0.421  16   0.243 303   0.110 214   0.054 171   0.060 116   0.046  54   0.051 356   0.044 316
DCP 3      .030      2.684   1.660   3   0.311 358   0.170 287   0.105 191   0.065 116   0.055  56   0.053 332   0.040 259   0.017 251
DCP 4      .049      2.324   1.754   4   0.317   6   0.144 279   0.055 159   0.015 191   0.043  96   0.058 336   0.048 241   0.009 169
DCP 5      .074      2.025   1.066   6   0.258 350   0.108 250   0.058 120   0.009  31   0.021  38   0.048 295   0.044 195   0.025  86
DCP 6      .099      1.833   0.939   8   0.214 338   0.076 213   0.050  81   0.022 290   0.008  81   0.037 276   0.040 178   0.030  86
DCP 7      .149      1.391   0.788   8   0.160 313   0.079 159   0.050  41   0.012 232   0.017  29   0.028 269   0.019 167   0.010  61
DCP 8      .200      1.133   0.665  14   0.126 309   0.066 160   0.039  38   0.005 309   0.017 349   0.028 231   0.016 108   0.008  36
DCP 9      .250      0.993   0.571  13   0.108 295   0.075 127   0.040  13   0.005 178   0.017 306   0.024 187   0.019  66   0.007  59
DCP10      .300      0.856   0.481  14   0.077 284   0.067 106   0.036 347   0.011 177   0.009 298   0.014 147   0.012  56   0.006  34
DCP11      .399      0.636   0.398  28   0.059 298   0.061 118   0.028 354   0.008 221   0.007 220   0.014 115   0.013  16   0.009 170
DCP12      .501      0.524   0.321  34   0.045 289   0.063 101   0.029 320   0.011 208   0.006 232   0.014  82   0.009 323   0.009 149
DCP13      .600      0.416   0.262  47   0.039 303   0.053  96   0.024 306   0.010 156   0.006 244   0.012  39   0.004 330   0.006 127
DCP14      .701      0.358   0.227  65   0.032 315   0.042  92   0.023 277   0.015 137   0.005 152   0.011 355   0.005 246   0.006 136
DCP15      .800      0.184   0.169  66   0.018 262   0.038  83   0.021 260   0.006 125   0.008 154   0.015 352   0.001 302   0.003 107
DCP16      .900     -0.040   0.070  49   0.027 207   0.024  56   0.008 211   0.001 351   0.010 103   0.006 292   0.005  90   0.005 189
DCP17      .969     -0.057   0.025  53   0.016 235   0.012  86   0.005 199   0.002 233   0.003 267   0.009 300   0.002 102   0.008 190

                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ      K             MACH NO       DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT   CYCLES ANALYSED
                 0.0      53.94         0.199         0.411         5.57        0.0         10.13       12085.3       20

               V          Q              RN            CN(MIN)       CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                138.3     50068.         0.65E 07     -0.133         1.418       15.70      -0.00054     0.618        0.0
               (453.7)   (1045.7)
                                                                 HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               10.127   5.573   0   0.428  16   0.325 298   0.025  28   0.034  68   0.021  15   0.031 105   0.012  78   0.010 206
CN                   0.845   0.459  36   0.099 324   0.019 220   0.027  99   0.009 338   0.011 339   0.008 233   0.008 163   0.000 239
CM                  -0.019   0.065 209   0.038  54   0.017 315   0.012 260   0.007 149   0.004 113   0.005  26   0.004 298   0.002 211

DCP 1      .010      3.173   0.936  16   0.909  71   0.398   4   0.139  22   0.093 355   0.070 325   0.017   9   0.008 194   0.009 334
DCP 2      .020      3.090   1.027  32   0.674  56   0.243   0   0.141  14   0.097 332   0.073 301   0.011 253   0.009 327   0.028 327
DCP 3      .030      2.741   0.807  46   0.777  58   0.353 339   0.096 306   0.052 300   0.067 271   0.032 182   0.006 186   0.007 302
DCP 4      .049      2.583   0.871  41   0.555  34   0.183 314   0.054 342   0.054 263   0.020 219   0.010  64   0.016 287   0.027 268
DCP 5      .074      2.212   0.842  42   0.464  19   0.151 292   0.027 321   0.043 226   0.003  74   0.011 306   0.020 204   0.011 220
DCP 6      .099      2.003   0.798  45   0.402   9   0.116 287   0.041 317   0.062 216   0.023  92   0.015 316   0.025 224   0.021 194
DCP 7      .149      1.566   0.783  39   0.335 344   0.101 267   0.051 265   0.058 191   0.020 145   0.031 134   0.016  80   0.008  27
DCP 8      .200      1.295   0.698  41   0.239 348   0.070 268   0.037 236   0.037 179   0.017 129   0.020 105   0.007   6   0.007 160
DCP 9      .250      1.146   0.681  34   0.246 318   0.086 232   0.068 175   0.052 120   0.032  59   0.023  19   0.015 335   0.016 299
DCP10      .300      1.015   0.614  32   0.206 334   0.078 217   0.068 156   0.047  91   0.034  37   0.026   1   0.024 291   0.020 231
DCP11      .399      0.852   0.555  35   0.186 297   0.063 215   0.077 153   0.042  82   0.035  37   0.030 336   0.029 255   0.023 266
DCP12      .501      0.663   0.466  36   0.145 279   0.061 189   0.080 121   0.053  28   0.036 346   0.039 273   0.031 197   0.018 139
DCP13      .600      0.530   0.386  37   0.133 261   0.066 154   0.073  94   0.048 353   0.037 325   0.036 251   0.045 168   0.028  71
DCP14      .701      0.446   0.284  42   0.121 236   0.069 115   0.065  62   0.046 304   0.022 297   0.037 206   0.031 110   0.019  12
DCP15      .800      0.267   0.217  28   0.124 219   0.069 101   0.050  51   0.038 303   0.024 267   0.033 176   0.025  82   0.009   2
DCP16      .900      0.019   0.138  16   0.079 221   0.039 118   0.043  28   0.030 277   0.021 211   0.018 135   0.015  73   0.010 297
DCP17      .969     -0.038   0.062   5   0.038 232   0.027 137   0.028  48   0.019 292   0.015 231   0.018 170   0.018  63   0.004 341
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ      DRIVE HZ     K              MACH NO        DEL.ALPHA     DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
                0.0           53.93        0.200          0.409          5.47          0.0            12.28          12085.4       20

               V             Q            RN             CM(MIN)        CN(MAX)       ALPHA.NMAX     AERO DAMP      TDR           EXT DAMP
                137.4         49561.       0.65E 07      -0.227          1.688         17.48         -0.00042        0.477         0.0
               (450.8)       (1035.1)                                        HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              12.278    5.470   0   0.454  26   0.381 323   0.062 108   0.050  98   0.037 355   0.047 133   0.025 195   0.015 180
CN                  0.979    0.497  43   0.091 358   0.071 294   0.040 188   0.020 124   0.013  60   0.010  29   0.007 289   0.003 173
CM                 -0.041    0.086 196   0.047  77   0.028  36   0.021 312   0.007 252   0.006 241   0.007 171   0.005  94   0.003   7

DCP 1     .010      3.442    0.392 117   1.229  87   0.274  77   0.112  53   0.182 147   0.090  46   0.042 215   0.083 136   0.036  62
DCP 2     .020      3.256    0.667  90   0.890  81   0.279  50   0.104  43   0.140  90   0.125  41   0.031  49   0.082 127   0.065  69
DCP 3     .030      3.013    0.658  93   0.898  75   0.294  24   0.096  27   0.121  50   0.113   7   0.060   0   0.024  26   0.047   4
DCP 4     .049      2.810    0.791  73   0.567  56   0.132  25   0.101   8   0.051  37   0.066 343   0.010  47   0.014  30   0.018 354
DCP 5     .074      2.426    0.774  67   0.427  41   0.122  14   0.091 340   0.031  12   0.058 321   0.004 310   0.016 312   0.017 326
DCP 6     .099      2.178    0.768  63   0.342  35   0.150  17   0.108 317   0.020 344   0.061 310   0.020 245   0.013 271   0.015 322
DCP 7     .149      1.738    0.776  52   0.291  16   0.172 348   0.118 283   0.032 263   0.041 258   0.023 232   0.019 194   0.012 220
DCP 8     .200      1.446    0.711  54   0.252  23   0.186 337   0.096 260   0.030 273   0.020 236   0.027 273   0.029 201   0.006 194
DCP 9     .250      1.306    0.701  47   0.229  10   0.236 321   0.144 245   0.062 214   0.025 193   0.046 183   0.033 130   0.017  92
DCP10     .300      1.159    0.636  43   0.184   3   0.211 311   0.140 226   0.063 189   0.032 166   0.055 142   0.028  80   0.019  60
DCP11     .399      1.002    0.618  42   0.129 350   0.185 312   0.140 229   0.071 183   0.043 163   0.059 131   0.033  53   0.015  86
DCP12     .501      0.813    0.572  36   0.121 313   0.149 283   0.111 196   0.070 158   0.058 112   0.051  67   0.040 349   0.014 319
DCP13     .600      0.675    0.534  32   0.153 282   0.136 249   0.117 160   0.062 126   0.066  69   0.075  35   0.065 315   0.037 265
DCP14     .701      0.573    0.454  29   0.190 261   0.133 214   0.122 128   0.065  74   0.055  37   0.059 344   0.051 265   0.028 196
DCP15     .800      0.369    0.375  19   0.188 252   0.150 191   0.130 102   0.071  32   0.041 342   0.042 308   0.032 212   0.020 129
DCP16     .900      0.092    0.240   3   0.114 239   0.094 171   0.067  76   0.031   6   0.019 357   0.034 301   0.024 209   0.019 153
DCP17     .969     -0.006    0.102   2   0.050 253   0.042 176   0.038  77   0.026   6   0.006 328   0.018 265   0.003  80   0.006 202
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ      DRIVE HZ     K              MACH NO        DEL.ALPHA     DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
                0.0           53.73        0.201          0.406          5.44          0.0            15.08          12085.5       20

               V             Q            RN             CM(MIN)        CN(MAX)       ALPHA.NMAX     AERO DAMP      TDR           EXT DAMP
                136.1         48809.       0.65E 07      -0.262          1.833         19.03         -0.00081        0.906         0.0
               (446.6)       (1019.4)                                        HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9.PHI

ALPHA              15.082    5.439   0   0.303  36   0.328  15   0.083 172   0.029 199   0.065  69   0.053 246   0.009 334   0.020 186
CN                  1.063    0.526  55   0.076  37   0.081 358   0.067 283   0.019 199   0.010 211   0.016 201   0.011 118   0.005 307
CM                 -0.059    0.115 197   0.034 124   0.031  97   0.022  50   0.007 317   0.005  22   0.006 331   0.007 258   0.005 171

DCP 1     .010      3.679    1.487 156   0.690 117   0.248 167   0.107 265   0.107 213   0.024 336   0.031 321   0.051 276   0.025 315
DCP 2     .020      3.385    1.025 132   0.562 109   0.223 132   0.099 188   0.166 202   0.060 188   0.080 279   0.054 284   0.069 314
DCP 3     .030      2.967    1.135 136   0.562 105   0.342 126   0.144  87   0.115 178   0.108 127   0.048 191   0.044 174   0.043 229
DCP 4     .049      2.865    0.985 105   0.250  84   0.251 103   0.069  44   0.028 155   0.050 128   0.005 188   0.022 270   0.042 223
DCP 5     .074      2.494    0.936  94   0.209  77   0.260  79   0.060   0   0.041 118   0.048  91   0.015 107   0.019 113   0.034 187
DCP 6     .099      2.240    0.874  88   0.184  87   0.288  69   0.070 344   0.026 117   0.045 104   0.009  82   0.016 171   0.040 178
DCP 7     .149      1.826    0.802  71   0.182  79   0.281  41   0.084 330   0.029 352   0.042  57   0.042 324   0.026 248   0.020 157
DCP 8     .200      1.566    0.767  68   0.203  71   0.251  35   0.105 346   0.032 324   0.043  11   0.036 301   0.016 259   0.013 240
DCP 9     .250      1.403    0.739  59   0.209  60   0.259  12   0.134 319   0.057 291   0.028 335   0.036 285   0.014 253   0.014 328
DCP10     .300      1.260    0.673  53   0.182  57   0.221   5   0.136 319   0.049 275   0.035 337   0.035 252   0.014 199   0.019 271
DCP11     .399      1.117    0.684  49   0.127  45   0.194   0   0.166 323   0.065 272   0.056 298   0.052 233   0.011 215   0.020 241
DCP12     .501      0.915    0.667  41   0.101   9   0.154 347   0.155 297   0.067 232   0.060 245   0.055 191   0.021 185   0.023 133
DCP13     .600      0.770    0.631  36   0.119 330   0.147 311   0.144 266   0.053 213   0.068 216   0.053 180   0.049 132   0.034  68
DCP14     .701      0.655    0.547  30   0.138 305   0.160 274   0.138 229   0.072 149   0.059 164   0.036 117   0.054  94   0.040   1
DCP15     .800      0.452    0.457  20   0.151 297   0.159 249   0.124 200   0.069 118   0.030 110   0.010  97   0.037  64   0.030 331
DCP16     .900      0.146    0.289   8   0.094 290   0.090 231   0.078 175   0.042  82   0.009 133   0.034 105   0.041  23   0.031 295
DCP17     .969      0.021    0.141  14   0.062 297   0.051 234   0.049 166   0.037  71   0.008  18   0.008 195   0.010  48   0.005  17
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H       ALPHA.0       TEST POINT   CYCLES ANALYSED
                   0.0         58.53       0.252          0.409        5.75         0.0         1.00         12031.1       20

                 V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX  AERO DAMP     TDR          EXT DAMP
                  138.4        49398.       0.65E 07     -0.053        0.592         6.95      -0.00366       0.757        0.0
                 (454.0)      (1031.7)                                 HARMONIC ANALYSIS
DATA
TYPE         X/C     RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                1.000    5.750   0    0.478 354    0.148 227    0.096 129    0.035 267    0.043  47    0.018 [illegible]    0.014  43    0.016 167
CN                   0.167    0.416   6    0.035  20    0.011 275    0.004 185    0.005 273    0.003 159    0.003 [illegible]    0.007  72    0.003 184
CM                  -0.018    0.029 286    0.006 294    0.003 134    0.001 112    0.001 111    0.001 213    0.001 [illegible]    0.000 167    0.001  20

DCP 1       .010    -0.529    2.933 343    0.343   1    0.095 124    0.020 156    0.024 165    0.020 199    0.012 [illegible]    0.008 177    0.003 353
DCP 2       .020    -0.184    2.098 352    0.184 333    0.038 235    0.002 216    0.011 296    0.039 189    0.007 [illegible]    0.005 209    0.002 269
DCP 3       .030     0.099    1.792 351    0.124 330    0.028 217    0.017 134    0.023 249    0.034 295    0.013 [illegible]    0.038  71    0.001 274
DCP 4       .049     0.270    1.464 353    0.122 337    0.034 232    0.018 173    0.014 218    0.038 301    0.005 [illegible]    0.010 102    0.007 312
DCP 5       .074     0.404    1.188 354    0.100 345    0.030 228    0.021 161    0.004 188    0.005 136    0.004 [illegible]    0.011  34    0.004   5
DCP 6       .099     0.426    1.028 356    0.085 355    0.013 232    0.023 153    0.001 203    0.032 232    0.007 [illegible]    0.004 147    0.006  92
DCP 7       .149     0.309    0.773 358    0.072   0    0.012 254    0.016 149    0.004 294    0.034 285    0.004 [illegible]    0.005 218    0.011 215
DCP 8       .200     0.252    0.633   6    0.050  25    0.013 252    0.002 123    0.012 282    0.031 173    0.005 [illegible]    0.031 345    0.011 213
DCP 9       .250     0.335    0.550   4    0.057  13    0.012 266    0.005 207    0.038 274    0.036 117    0.007 [illegible]    0.004 118    0.005 123
DCP10       .300     0.232    0.466   6    0.050  14    0.016 271    0.006 168    0.007 294    0.001  95    0.003 [illegible]    0.002 255    0.006  69
DCP11       .399     0.208    0.382  20    0.040  40    0.018 297    0.005 191    0.036 289    0.032 223    0.005 [illegible]    0.011 151    0.007 114
DCP12       .501     0.158    0.303  26    0.034  49    0.017 287    0.025 207    0.011 277    0.035 232    0.005 [illegible]    0.004   9    0.003 124
DCP13       .600     0.170    0.244  34    0.030  70    0.013 295    0.039 274    0.007 299    0.004 257    0.003 [illegible]    0.007 346    0.000 292
DCP14       .701     0.215    0.177  37    0.023  76    0.010 283    0.003 248    0.003 262    0.034  84    0.002 [illegible]    0.005 344    0.006 231
DCP15       .800     0.109    0.117  47    0.017 130    0.012 315    0.002 324    0.003 146    0.035  19    0.005 [illegible]    0.002 340    0.006 212
DCP16       .900    -0.065    0.054  61    0.017 133    0.009 338    0.004  90    0.003 313    0.009  73    0.005 [illegible]    0.000 282    0.007 196
DCP17       .969    -0.036    0.029 183    0.003 138    0.008 294    0.005 243    0.001 210    0.035 323    0.007 [illegible]    0.006 150    0.005 235

                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H       ALPHA.0       TEST POINT   CYCLES ANALYSED
                   0.0         69.72       0.259          0.406        5.93         0.0         2.46         12031.[illegible]   20

                 V            Q            RN            CM(MIN)      CN(MAX)      ALPHA.NMAX  AERO DAMP     TDR          EXT DAMP
                  137.0        48718.       0.64E 07     -0.051        0.785         8.72      -0.00371       0.81[illegible]   0.0
                 (449.6)      (1017.5)                                 HARMONIC ANALYSIS
DATA
TYPE         X/C     RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                2.456    5.933   0    0.506 340    0.123 231    0.053 133    0.027 333    0.023  88    0.014 [illegible]    0.006  86    0.007 214
CN                   0.370    0.412   5    0.035  11    0.008 283    0.001 116    0.003 317    0.005 163    0.002 [illegible]    0.001  61    0.000 139
CM                  -0.011    0.035 295    0.006 279    0.002 151    0.001 187    0.001 178    0.001   8    0.001 [illegible]    0.000 325    0.000 352

DCP 1       .010     1.002    2.881 341    0.226 322    0.048 152    0.024  72    0.028 243    0.013  97    0.005 [illegible]    0.030   1    0.011 263
DCP 2       .020     0.893    2.248 349    0.171 332    0.026 235    0.009 106    0.016 270    0.012 148    0.003 [illegible]    0.005  41    0.006 307
DCP 3       .030     0.982    1.913 348    0.140 331    0.025 259    0.006 115    0.013 269    0.011 123    0.005 [illegible]    0.002 336    0.002  36
DCP 4       .049     1.025    1.584 350    0.129 329    0.023 218    0.011 161    0.005 256    0.007  99    0.007 [illegible]    0.004 289    0.005   1
DCP 5       .074     1.023    1.259 350    0.103 335    0.013 234    0.008 117    0.008 246    0.013  76    0.006 [illegible]    0.004  43    0.000 159
DCP 6       .099     0.946    1.067 353    0.093 347    0.018 263    0.009 142    0.005 257    0.009  72    0.024 [illegible]    0.001 279    0.005  34
DCP 7       .149     0.692    0.786 356    0.072 353    0.013 230    0.005 125    0.001 266    0.008  99    0.002 [illegible]    0.002  68    0.004 359
DCP 8       .200     0.562    0.651   4    0.058   5    0.011 278    0.006 239    0.005 316    0.010 208    0.010 [illegible]    0.005 139    0.004 163
DCP 9       .250     0.592    0.549   3    0.056   0    0.015 260    0.002 179    0.006 285    0.005 166    0.006 [illegible]    0.005 330    0.005  45
DCP10       .300     0.449    0.459   4    0.047  16    0.008 287    0.002 159    0.001 294    0.036 114    0.002 [illegible]    0.004  28    0.002  74
DCP11       .399     0.376    0.371  21    0.041  38    0.007 290    0.003 296    0.009 359    0.007 209    0.004 [illegible]    0.006  32    0.005 196
DCP12       .501     0.283    0.290  27    0.041  37    0.010 295    0.007 231    0.003  11    0.005 198    0.002 [illegible]    0.004 189    0.004 356
DCP13       .600     0.263    0.231  36    0.032  59    0.013 310    0.003  88    0.007 345    0.009 163    0.003 [illegible]    0.001 124    0.003 227
DCP14       .701     0.280    0.160  45    0.025  63    0.012 315    0.007  37    0.004  31    0.007 151    0.004 [illegible]    0.002  15    0.002 102
DCP15       .800     0.143    0.113  60    0.016  81    0.006 318    0.003  13    0.005 319    0.006 158    0.006 [illegible]    0.004 245    0.002  88
DCP16       .900    -0.070    0.050  87    0.015 124    0.005 287    0.001 335    0.008 192    0.013 217    0.006 [illegible]    0.007 125    0.005 197
DCP17       .969    -0.053    0.029 157    0.002 151    0.011  43    0.003  89    0.004 351    0.003 136    0.004 [illegible]    0.002 281    0.002 164
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ     K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
            0.0       69.83       0.261      0.404      5.90        0.0          4.96      12011.3      20

          V          Q           RN          CM(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
         136.3       48354.      0.64E 07   -0.044      1.027       11.01      -0.00077     0.082       0.0
        (447.2)     (1009.9)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES   PHI   RES 7 PHI           RES 8 PHI   RES 9 PHI

ALPHA             4.956   5.904   0   0.498 343   0.096 208   0.022 127   0.001 157   0.021 105   0.016 [illegible]   0.006 341   0.009  97
CN                0.613   0.438   6   0.042  12   0.037 273   0.033 261   0.003 238   0.034 248   0.032 [illegible]   0.091  37   0.032  94
CM               -0.005   0.038 296   0.006 250   0.002 150   0.001 205   0.001  83   0.002  88   0.021 [illegible]   0.000 351   0.001 272

DCP 1   .010      2.828   3.109 342   0.341 277   0.098 155   0.051 191   0.082 111   0.061  26   0.027 [illegible]   0.039 343   0.014 198
DCP 2   .023      2.144   2.244 349   0.192 329   0.051 231   0.067  66   0.082 328   0.098 242   0.063 [illegible]   0.048  49   0.014  60
DCP 3   .030      2.040   1.877 349   0.145 350   0.024 330   0.020 235   0.019 169   0.009  98   0.062 [illegible]   0.007 327   0.004 166
DCP 4   .049      1.937   1.565 353   0.126 348   0.034 333   0.017 225   0.012 153   0.004 136   0.031 [illegible]   0.003 355   0.001 230
DCP 5   .074      1.741   1.233 352   0.087 354   0.018 226   0.024 208   0.017 196   0.010 217   0.012 [illegible]   0.005  20   0.008  25
DCP 6   .099      1.550   1.042 354   0.091 354   0.012 266   0.004 231   0.001  98   0.036 143   0.001 [illegible]   0.031  70   0.001  34
DCP 7   .149      1.144   0.773 356   0.068 357   0.010 257   0.033 313   0.009 249   0.012 200   0.002 [illegible]   0.004  87   0.009 259
DCP 8   .200      0.932   0.641   6   0.066   8   0.011 263   0.005 209   0.004 336   0.005 139   0.001 [illegible]   0.003 299   0.003 229
DCP 9   .250      0.900   0.543   4   0.058 359   0.015 216   0.034 308   0.006 234   0.034 155   0.025 [illegible]   0.036 283   0.002 293
DCP10   .333      0.713   0.449   7   0.056  11   0.010 230   0.004 139   0.005 180   0.005 292   0.023 [illegible]   0.005 328   0.001 211
DCP11   .399      0.586   0.360  22   0.051  34   0.010 262   0.004 273   0.004 256   0.006 233   0.002 [illegible]   0.006  20   0.007  95
DCP12   .501      0.441   0.290  33   0.045  37   0.007 333   0.033  22   0.036 265   0.013 239   0.027 [illegible]   0.005 154   0.002 305
DCP13   .603      0.379   0.230  41   0.038  49   0.010 334   0.006 338   0.002 222   0.008 278   0.025 [illegible]   0.004 200   0.006  51
DCP14   .701      0.355   0.164  54   0.034  44   0.008 281   0.032  49   0.005 209   0.039 302   0.038 [illegible]   0.034 217   0.008 129
DCP15   .833      0.179   0.123  67   0.023  56   0.008 316   0.034  74   0.004 256   0.033 276   0.035 [illegible]   0.005 143   0.013  84
DCP16   .900     -0.052   0.056  86   0.009  43   0.005 331   0.003  60   0.008 307   0.005 279   0.047 [illegible]   0.002 351   0.003  94
DCP17   .969     -0.062   0.024 193   0.008  18   0.005  33   0.003  13   0.005 221   0.037 172   0.024 [illegible]   0.034  29   0.007 265
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ     K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
            0.0       69.74       0.262      0.402      5.88        0.0          7.44      12011.4      20

          V          Q           RN          CM(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
         135.4       47895.      0.64E 07   -0.046      1.292       13.32      -0.03386     0.074       0.0
        (444.4)     (1000.3)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI           RES 8 PHI   RES 9 PHI

ALPHA             7.439   5.883   0   0.579 345   0.089 159   0.026 165   0.022 164   0.033 106   0.017 [illegible]   0.011 162   0.009  26
CN                0.778   0.451  20   0.058 323   0.010  86   0.012 263   0.008 182   0.005  75   0.028 [illegible]   0.007 231   0.000  70
CM               -0.001   0.040 278   0.012  10   0.011 232   0.006  97   0.001  10   0.032 167   0.003 [illegible]   0.001 276   0.000 172

DCP 1   .013      3.418   1.969 353   0.078  27   0.031 298   0.255 186   0.087 309   0.182 183   0.111 [illegible]   0.032 228   0.059  76
DCP 2   .020      2.883   1.800   3   0.575  14   0.332 288   0.157 201   0.066 178   0.103 150   0.061 [illegible]   0.064  43   0.060  11
DCP 3   .030      2.787   1.716   1   0.418 358   0.242 272   0.168 184   0.094 121   0.074  86   0.069 [illegible]   0.068 319   0.053 252
DCP 4   .049      2.551   1.531   2   0.323 340   0.135 230   0.071 120   0.011 215   0.056 106   0.053 [illegible]   0.043 262   0.014 176
DCP 5   .074      2.257   1.246   3   0.257 332   0.107 214   0.052 108   0.017 166   0.055  67   0.057 [illegible]   0.043 226   0.012 123
DCP 6   .099      1.980   1.345   7   0.221 329   0.096 198   0.052  87   0.013 243   0.035  78   0.063 [illegible]   0.031 226   0.007 159
DCP 7   .149      1.476   0.837   8   0.162 318   0.070 174   0.027  75   0.012 135   0.025  19   0.037 [illegible]   0.021 151   0.008  90
DCP 8   .200      1.217   0.718  15   0.133 310   0.072 166   0.030  41   0.015 177   0.017 353   0.032 [illegible]   0.019 179   0.008  87
DCP 9   .253      1.163   0.649  12   0.100 278   0.076 112   0.032 337   0.009 167   0.026 286   0.031 [illegible]   0.019  34   0.007 316
DCP10   .300      0.920   0.541  14   0.069 267   0.059  89   0.040 309   0.018 174   0.010 209   0.010 [illegible]   0.011 279   0.003 183
DCP11   .399      0.750   0.455  29   0.053 269   0.057  93   0.063 329   0.019 247   0.013 239   0.016 [illegible]   0.019   4   0.009 220
DCP12   .501      0.553   0.364  37   0.032 262   0.051  72   0.044 287   0.013 172   0.004  91   0.011 [illegible]   0.005 196   0.004 256
DCP13   .600      0.443   0.301  49   0.017 276   0.040  56   0.031 269   0.005 157   0.001  37   0.013 [illegible]   0.005 211   0.003 284
DCP14   .701      0.371   0.260  65   0.016 279   0.040  46   0.033 257   0.037 124   0.008  38   0.019 [illegible]   0.007 138   0.009  13
DCP15   .800      0.193   0.191  71   0.017 213   0.035  20   0.020 212   0.003 315   0.009  64   0.015 [illegible]   0.002  68   0.004 261
DCP16   .900     -0.032   0.081  59   0.035 173   0.027 355   0.010 210   0.006 156   0.007  13   0.013 [illegible]   0.032  91   0.006  73
DCP17   .969     -0.064   0.019  78   0.016 173   0.015  10   0.033 201   0.004 276   0.015 355   0.014 [illegible]   0.004 282   0.004 112
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                       FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ      DRIVE HZ      K            MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
              0.0           69.56         0.262        0.402         5.78          0.0           9.92         12031.5        20

             V             Q             RN           CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
              135.3          47837.       0.64E 07    -0.156         1.515         15.91        -0.00028       0.314         0.0
             (443.9)        (999.1)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               9.918    5.780   0    0.775 347    0.117 126    0.035 159    0.042 171    0.019  61    0.019 [illegible]    0.014 179    0.011  54
CN                  0.897    0.538  31    0.109 304    0.045 155    0.329  28    0.018 274    0.018 231    0.014 [illegible]    0.002 310    0.005  83
CM                 -0.019    0.048 236    0.047  29    0.325 289    0.015 184    0.006  90    0.007  35    0.013 [illegible]    0.004 110    0.002 261

DCP 1    .010       3.801    1.268  17    1.043  44    0.434 340    0.071  15    0.126 342    0.036 345    0.103 [illegible]    0.101 281    0.071 215
DCP 2    .020       3.108    1.123  32    0.883  42    0.379 345    0.163 312    0.123 279    0.065 237    0.047 [illegible]    0.068 276    0.084 239
DCP 3    .030       2.814    1.016  42    0.907  31    0.356 317    0.074 297    0.173 279    0.152 208    0.043 [illegible]    0.052 195    0.076 137
DCP 4    .049       2.673    1.097  33    0.624  15    0.158 330    0.356 311    0.123 244    0.369 165    0.026 [illegible]    0.070 163    0.052  92
DCP 5    .074       2.355    1.007  37    0.562   2    0.149 273    0.051 274    0.114 212    0.063 143    0.025 [illegible]    0.072 104    0.052  14
DCP 6    .099       2.101    0.978  37    0.482 351    0.131 250    0.066 275    0.111 199    0.059 125    0.018 [illegible]    0.047  77    0.024   7
DCP 7    .149       1.633    0.891  31    0.347 329    0.103 214    0.369 239    0.071 138    0.025  34    0.336 [illegible]    0.028  21    0.011 247
DCP 8    .200       1.378    0.845  34    0.301 324    0.108 217    0.061 198    0.366 134    0.033  47    0.031 [illegible]    0.029 323    0.016 261
DCP 9    .250       1.319    0.806  27    0.273 299    0.116 189    0.381 144    0.070  58    0.033 333    0.030 [illegible]    0.027 232    0.019 183
DCP10    .300       1.093    0.741  24    0.265 285    0.116 183    0.385 125    0.361  37    0.037 334    0.045 [illegible]    0.022 170    0.004 122
DCP11    .399       0.913    0.642  32    0.209 282    0.136 183    0.103 102    0.063  10    0.042 320    0.033 [illegible]    0.035 146    0.012  60
DCP12    .501       0.693    0.533  32    0.174 257    0.135 152    0.135  58    0.072 325    0.363 269    0.358 [illegible]    0.349  72    0.017 352
DCP13    .600       0.555    0.433  35    0.156 236    0.124 126    0.133  26    0.059 293    0.066 245    0.077 [illegible]    0.041  10    0.007  27
DCP14    .701       0.464    0.339  37    0.157 213    0.112  98    0.089 357    0.057 256    0.051 208    0.063 [illegible]    0.047 314    0.015 177
DCP15    .800       0.283    0.236  23    0.161 189    0.398  73    0.379 329    0.343 221    0.344 179    0.361 [illegible]    0.338 263    0.314 137
DCP16    .900       0.014    0.141  10    0.104 188    0.362  72    0.373 316    0.037 205    0.035 133    0.041 [illegible]    0.032 227    0.024  65
DCP17    .969      -0.037    0.050 356    0.044 202    0.036  84    0.036 329    0.016 217    0.015 169    0.027 [illegible]    0.019 264    0.006 105

                       FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ      DRIVE HZ      K            MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
              0.0           68.60         0.252        0.409         5.66          0.0          12.39         12033.1        20

             V             Q             RN           CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
              138.5          49527.       0.65E 07    -0.259         1.754         18.37         0.00024      -0.276         0.0
             (454.3)        (1034.4)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              12.387    5.656   0    0.853 356    0.120 162    0.042 131    0.042 191    0.029  29    0.026 [illegible]    0.014 146    0.004 177
CN                  1.055    0.541  35    0.104 332    0.345 214    0.315 115    0.311 134    0.026  23    0.315 [illegible]    0.003 142    0.007   4
CM                 -0.057    0.105 183    0.066  48    0.030 331    0.012 224    0.003 269    0.010 171    0.011 [illegible]    0.004 292    0.002 201

DCP 1    .010       3.989    0.694 141    1.514  63    0.137   7    0.204  85    0.363  42    0.356 212    0.099 [illegible]    0.050 111    0.030 107
DCP 2    .020       3.256    0.752 108    1.111  64    0.261  25    0.133  87    0.170  34    0.062 323    0.054 [illegible]    0.051  72    0.042 100
DCP 3    .030       3.069    0.741  96    0.950  54    0.161   7    0.168  72    0.145  17    0.093 342    0.045 [illegible]    0.347 352    0.039 329
DCP 4    .049       2.927    0.709  66    0.572  46    0.168  57    0.142  22    0.072 339    0.358 337    0.027 [illegible]    0.034 322    0.022 313
DCP 5    .074       2.250    0.763  60    0.485  32    0.120  25    0.100 337    0.044 295    0.047 314    0.016 [illegible]    0.036 292    0.035 263
DCP 6    .099       2.325    0.789  59    0.452  23    0.121   7    0.113 317    0.347 263    0.331 301    0.022 [illegible]    0.035 221    0.013 331
DCP 7    .149       1.834    0.827  50    0.402   4    0.119 311    0.095 264    0.051 229    0.025 210    0.334 [illegible]    0.018 171    0.013 202
DCP 8    .200       1.560    0.813  51    0.391   5    0.174 301    0.105 236    0.026 233    0.045 226    0.039 [illegible]    0.005 190    0.015 140
DCP 9    .250       1.384    0.789  43    0.363 350    0.223 276    0.125 204    0.054 213    0.367 157    0.067 [illegible]    0.017  37    0.021  59
DCP10    .300       1.229    0.744  38    0.313 337    0.219 260    0.138 181    0.054 169    0.073 120    0.053 [illegible]    0.020 310    0.024  27
DCP11    .399       1.072    0.705  38    0.232 328    0.198 257    0.118 182    0.072 173    0.095 100    0.053 [illegible]    0.028 322    0.031 342
DCP12    .501       0.889    0.667  29    0.230 288    0.157 223    0.391 153    0.082 129    0.111  53    0.383 [illegible]    0.028 256    0.020 276
DCP13    .600       0.779    0.621  21    0.243 253    0.157 181    0.088 107    0.076  91    0.133  13    0.113 [illegible]    0.049 201    0.022 164
DCP14    .701       0.662    0.529  12    0.289 228    0.187 148    0.120  56    0.052  32    0.133 329    0.096 [illegible]    0.351 117    0.012  73
DCP15    .800       0.447    0.438   2    0.279 213    0.180 125    0.132  23    0.047 315    0.053 273    0.063 [illegible]    0.038  69    0.022  21
DCP16    .900       0.126    0.276 347    0.171 196    0.120  95    0.071 328    0.010 321    0.037 279    0.054 [illegible]    0.028  64    0.021 332
DCP17    .969       0.031    0.148 343    0.096 203    0.065  95    0.362 340    0.323 230    0.337   8    0.011 [illegible]    0.014 195    0.016  96
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                        FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0          69.06       0.257        0.405        5.63         0.0        14.95        12333.2       20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                                     0.64E 07    -0.304        1.984        19.94     -0.00037     0.376        0.0
          136.6        48527.
          (448.2)      (1013.5)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              14.967   5.632   0   0.695   0   0.203 235   0.027 218   0.042 196   0.201  23   0.029 [illegible]   0.020 173   0.012 242
CN                  1.162   0.587  39   0.132  11   0.059 263   0.029 227   0.023 212   0.024 109   0.011 [illegible]   0.008 141   0.011  92
CM                 -0.076   0.145 186   0.056  85   0.034  16   0.031 295   0.013  18   0.015 263   0.030 [illegible]   0.031   5   0.032 258

DCP 1    .010       4.134   1.654 160   1.029  79   0.269 110   0.193 182   0.102  79   0.177 293   0.001 [illegible]   0.054 307   0.101 259
DCP 2    .020       3.984   1.089 161   0.934  91   0.211  63   0.263 197   0.175 125   0.365 265   0.182 [illegible]   0.027 298   0.081 288
DCP 3    .033       3.140   1.349 130   0.759  76   0.224 135   0.133 132   0.212 137   0.382  95   0.148 [illegible]   0.067 131   0.051 196
DCP 4    .049       3.068   0.717  92   0.457  76   0.275  77   0.358  88   0.063  82   0.311  82   0.085 [illegible]   0.076 167   0.059 159
DCP 5    .074       2.377   0.812  87   0.385  84   0.223  55   0.273  96   0.133  43   0.238  19   0.027 [illegible]   0.362 135   0.045  82
DCP 6    .099       2.471   0.632  70   0.386  55   0.204  26   0.085  81   0.101   4   0.042 356   0.064 [illegible]   0.021  63   0.014 118
DCP 7    .149       1.957   0.827  60   0.399  45   0.275 348   0.065 273   0.053   8   0.375 319   0.089 [illegible]   0.008 246   0.018  61
DCP 8    .200       1.672   0.813  61   0.448  49   0.300 343   0.052 283   0.356 352   0.381 323   0.034 [illegible]   0.014  31   0.004 120
DCP 9    .250       1.517   0.792  50   0.434  33   0.306 319   0.090 273   0.061 304   0.284 249   0.011 [illegible]   0.032 272   0.014 176
DCP10    .300       1.355   0.754  44   0.378  22   0.290 305   0.116 256   0.082 259   0.078 255   0.017 [illegible]   0.027 218   0.022 132
DCP11    .399       1.209   0.785  41   0.298  16   0.254 307   0.151 271   0.098 246   0.123 198   0.033 [illegible]   0.036 164   0.062 139
DCP12    .501       1.028   0.795  30   0.211 338   0.206 269   0.120 241   0.115 216   0.149 152   0.062  36   0.039  91   0.067  57
DCP13    .600       0.903   0.801  23   0.246 263   0.188 233   0.388 239   0.137 186   0.138 137   0.062   4   0.341  63   0.067  11
DCP14    .701       0.767   0.719  15   0.278 268   0.223 193   0.391 151   0.381 126   0.133  55   0.073 [illegible]   0.015 327   0.036 287
DCP15    .800       0.525   0.583   4   0.266 248   0.216 166   0.106  83   0.020  46   0.372  31   0.078 [illegible]   0.017 200   0.018 170
DCP16    .900       0.177   0.337 352   0.148 227   0.123 128   0.259  33   0.317 198   0.359  29   0.035 [illegible]   0.019 190   0.027  98
DCP17    .969       0.051   0.175 353   0.096 235   0.086 125   0.063  25   0.037 260   0.334  97   0.033 [illegible]   0.031 289   0.033 172


                        FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0          69.06       0.261        0.399        5.63         0.0        17.31        12033.3       20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                                     0.64E 07    -0.333        2.077        21.37     -0.00031     0.334        0.0
          134.6        47320.
          (441.5)  ,   (988.3)
                                                        HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              17.307   5.633   0   0.498   7   0.227 233   0.026 246   0.039 165   0.031  29   0.011 [illegible]   0.003 337   0.008 208
CN                  1.200   0.580  42   0.193  33   0.091 306   0.314 256   0.017 240   0.017 225   0.035 [illegible]   0.334  98   0.034 313
CM                 -0.391   0.146 187   0.361 136   0.338  66   0.335 326   0.309  44   0.339 351   0.036 [illegible]   0.033 248   0.001  84

DCP 1    .010       3.839   2.086 158   0.490 117   0.137 156   0.188 181   0.093 351   0.375  52   0.035 [illegible]   0.347  50   0.065 356
DCP 2    .020       3.210   1.351 144   0.641 110   0.195 179   0.228 188   0.107 225   0.316 323   0.287 [illegible]   0.033  66   0.052  27
DCP 3    .033       2.925   1.328 130   0.422 114   0.250 121   0.230 204   0.104 181   0.111 214   0.091 [illegible]   0.046 264   0.041 297
DCP 4    .049       3.055   0.802  97   0.425 124   0.228  97   0.132 151   0.386 156   0.321 132   0.061 [illegible]   0.341 293   0.026 277
DCP 5    .074·      2.399   0.806  78   0.397 113   0.190  66   0.382 114   0.095 126   0.334  32   0.072 [illegible]   0.027 227   0.047 339
DCP 6    .099       2.510   0.838  69   0.365 100   0.146  54   0.085  87   0.068 114   0.330  14   0.052 [illegible]   0.003  60   0.018  12
DCP 7    .149       1.990   0.812  62   0.403  79   0.217   1   0.334  31   0.357  73   0.319  28   0.039 [illegible]   0.312 193   0.013 136
DCP 8    .200       1.738   0.807  66   0.319  71   0.226   9   0.259   4   0.086  75   0.041  21   0.022 [illegible]   0.019  75   0.003 243
DCP 9    .250       1.565   0.774  52   0.493  35   0.268 348   0.095 318   0.054  12   0.366 328   0.034 [illegible]   0.006  25   0.013 228
DCP10    .300       1.421   0.750  45   0.465  48   0.249 345   0.113 314   0.366 332   0.371 311   0.023 [illegible]   0.015 343   0.013 228
DCP11    .399       1.281   0.771  41   0.424  91   0.255 343   0.130 318   0.109 310   0.389 285   0.031 [illegible]   0.022 276   0.013 202
DCP12    .501       1.093   0.790  30   0.340  16   0.239 313   0.101 283   0.116 276   0.133 233   0.024 [illegible]   0.344 181   0.013 116
DCP13    .603       0.961   0.793  23   0.316 344   0.246 280   0.093 238   0.113 233   0.386 193   0.383 [illegible]   0.037 141   0.029  84
DCP14    .701       0.798   0.706  15   0.310 318   0.258 248   0.116 180   0.095 167   0.065 133   0.062 [illegible]   0.038  81   0.034   1
DCP15    .800       0.591   0.571   7   0.275 292   0.211 212   0.122 132   0.353 133   0.337 113   0.031 [illegible]   0.012  94   0.018 297
DCP16    .900       0.243   0.321   1   0.144 272   0.127 185   0.375  64   0.018 186   0.340 120   0.064 [illegible]   0.039 344   0.037 219
DCP17    .969       0.092   0.183   2   0.099 265   0.097 176   0.069  72   0.027 319   0.017 195   0.024 [illegible]   0.029  27   0.022 293
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                                FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                   TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0         69.05       0.263        0.396        5.72         0.0         19.88        12603.4       20

                   V           Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
                    133.4       46631.       0.63E 07    -0.347        2.039        23.08      -0.00128     [illegible]   0.0
                   (437.7)     (973.9)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI             RES 8 PHI   RES 9 PHI

ALPHA             19.885     5.721   0   0.344 355   0.157 299   0.016 241   0.009 159   0.032  44   0.047 [illegible]     0.001  55   0.002 225
CN                 1.222     0.551  48   0.167  69   0.117 357   0.023 316   0.016   7   0.013 298   0.026 [illegible]     0.006  95   0.008  63
CM                -0.113     0.140 232   0.050 183   0.045 131   0.008  54   0.009 155   0.013  74   0.007 [illegible]     0.002   0   0.003 199

DCP 1     .010     3.455     2.383 169   0.328 226   0.119 147   0.171 323   0.121 142   0.328  71   0.095 [illegible]     0.042 232   0.047 170
DCP 2     .020     2.903     1.279 155   0.362 193   0.159 238   0.270 301   0.342 286   0.349   0   0.206 [illegible]     0.021 261   0.025 130
DCP 3     .030     2.693     1.110 139   0.479 191   0.075 162   0.217 263   0.140 288   0.348   1   0.056 [illegible]     0.399  53   0.332 113
DCP 4     .049     2.847     0.746 133   0.522 167   0.123 173   0.365 171   0.399 275   0.355 237   0.365 [illegible]     0.315  75   0.019 119
DCP 5     .074     2.279     0.724  73   0.442 154   0.095 157   0.091  96   0.093 222   0.390 312   0.044 [illegible]     0.010  72   0.056 132
DCP 6     .099     2.425     0.783  58   0.366 147   0.114 127   0.081  36   0.388 226   0.324 156   0.323 [illegible]     0.329  62   0.336  97
DCP 7     .149     1.924     0.682  61   0.480  47   0.129  48   0.336   5   0.378 146   0.342 115   0.317 [illegible]     0.017  54   0.023  37
DCP 8     .200     1.670     0.635  65   0.425  49   0.210  71   0.039  11   0.068 168   0.340 140   0.684 [illegible]     0.017  85   0.020 112
DCP 9     .250     1.558     0.662  53   0.415  82   0.259  48   0.355   7   0.376  99   0.341  73   0.389 [illegible]     0.311  86   0.326  48
DCP10     .300     1.458     0.656  49   0.382  77   0.289  41   0.349  12   0.391  77   0.352  59   0.019 [illegible]     0.018 128   0.001   5
DCP11     .399     1.357     0.704  47   0.333  74   0.295  40   0.079  22   0.100  61   0.365  53   0.617 [illegible]     0.091  99   0.012   7
DCP12     .501     1.177     0.731  38   0.276  48   0.264   4   0.383   3   0.126  15   0.376 351   0.332 [illegible]     0.326  49   0.013 283
DCP13     .600     1.028     0.742  33   0.254  25   0.281 316   0.373 313   0.089 341   0.379 298   0.044 [illegible]     0.097 326   0.009 112
DCP14     .701     0.876     0.689  28   0.253   1   0.294 338   0.132 259   0.068 282   0.377 249   0.041 [illegible]     0.338 262   0.337 194
DCP15     .800     0.670     0.570  74   0.187 346   0.236 293   0.099 226   0.356 236   0.353 212   0.332 [illegible]     0.319 226   0.336  21
DCP16     .900     0.287     0.326  22   0.084 321   0.135 249   0.047 151   0.023 297   0.057 212   0.053 [illegible]     0.048 110   0.043   9
DCP17     .969     0.103     0.184  27   0.069 294   0.387 229   0.352 131   0.331  33   0.331 287   0.345 [illegible]     0.337 183   0.337  83

                                FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                   TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0         88.37       0.336        0.395        6.68         0.0         -0.00        12089.1       20

                   V           Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX  AERO DAMP    TDR          EXT DAMP
                    133.7       17266.       0.23E 07    -0.069        0.657        7.06       -0.00078      0.007        0.0
                   (438.7)     (360.6)
                                                                  HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             -0.001     6.678   0   1.228 301   0.090 218   0.090  95   0.051 353   0.015  55   0.036 353   0.010 228   0.008 196
CN                 0.112     0.468  14   0.077 290   0.011 308   0.005 267   0.005 262   0.003 313   0.005  11   0.005 216   0.002  11
CM                -0.016     0.055 291   0.007  98   0.003 130   0.002  42   0.002  26   0.001 177   0.003 196   0.001  58   0.000 237

DCP 1     .010    -0.767     3.395 341   0.283 262   0.032 311   0.027   6   0.031 228   0.011  78   0.014 199   0.015 321   0.017 111
DCP 2     .020    -0.299     2.342 352   0.321 267   0.008  10   0.036 198   0.047 282   0.007 353   0.027 228   0.010  11   0.012 132
DCP 3     .030    -0.099     2.069 351   0.260 267   0.013 291   0.002 356   0.010 292   0.007 199   0.014 239   0.007  79   0.002 290
DCP 4     .049     0.158     1.722 353   0.205 274   0.016 330   0.010 243   0.004 311   0.006 317   0.012 130   0.002 337   0.008   9
DCP 5     .074     0.288     1.417 354   0.169 284   0.020 244   0.008 153   0.007 359   0.005 312   0.016 139   0.003 334   0.005 219
DCP 6     .099     0.330     1.194 357   0.130 290   0.013 274   0.011 167   0.014   7   0.011 290   0.022 190   0.002 191   0.003  45
DCP 7     .149     0.245     0.886   0   0.108 305   0.021 299   0.019 188   0.015 265   0.008 343   0.007 126   0.005 221   0.010 273
DCP 8     .200     0.198     0.732  13   0.091 339   0.018  49   0.016 320   0.001  80   0.010 308   0.012 324   0.002 125   0.009  68
DCP 9     .250     0.151     0.654   8   0.136 278   0.003 228   0.034 354   0.011 301   0.007 151   0.001  34   0.008 125   0.002 131
DCP10     .300     0.164     0.550  11   0.096 291   0.017 306   0.019 342   0.016 312   0.004 196   0.007 107   0.014 181   0.014 287
DCP11     .399     0.138     0.445  32   0.096 305   0.010 275   0.019 332   0.009 329   0.015 250   0.006 348   0.016 221   0.008  50
DCP12     .501     0.107     0.371  41   0.074 314   0.009 322   0.016 255   0.007 276   0.016 333   0.015 289   0.006 156   0.003 342
DCP13     .600     0.138     0.311  54   0.063 304   0.016 322   0.022 223   0.005  92   0.004 337   0.013   5   0.021 222   0.006  31
DCP14     .701     0.206     0.252  58   0.043 313   0.017 293   0.002 132   0.008 143   0.013  96   0.025  26   0.006 335   0.008  38
DCP15     .800     0.102     0.198  74   0.016 244   0.010 269   0.017 161   0.013 172   0.006  36   0.022  10   0.010 216   0.005 273
DCP16     .900    -0.093     0.108 102   0.059 245   0.012   7   0.014 183   0.024 233   0.008 230   0.003 174   0.007 359   0.012 206
DCP17     .969    -0.050     0.050 157   0.061 234   0.016 300   0.022 332   0.009 264   0.012 348   0.011 109   0.004 293   0.017  78
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         88.56       0.338       0.395       6.67        0.0         2.46      12089.2       20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
            133.5       17294.      0.23E 07    -0.069      0.883       10.29       -0.00085    0.967       0.0
           (438.1)     (361.2)
                                                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.456     6.670   0   1.226 302   0.065 211   0.079 102   0.059 352   0.020  86   0.053 359   0.022 224   0.007 181
CN                 0.361     0.461  15   0.067 316   0.009  90   0.010 298   0.002 266   0.002 271   0.001 160   0.004 168   0.003  29
CM                -0.009     0.057 295   0.010 218   0.001 267   0.003  67   0.001  12   0.031 359   0.002 164   0.002 341   0.001 295

DCP 1    .010      0.987     3.224 341   0.372 251   0.046  99   0.045 355   0.034 232   0.023 199   0.048  80   0.029 199   0.004 269
DCP 2    .020      0.955     2.614 351   0.413 268   0.099 169   0.069  75   0.057 325   0.041 280   0.028 166   0.021 119   0.019  44
DCP 3    .030      0.967     2.100 350   0.228 276   0.046 314   0.037 227   0.011 173   0.004  98   0.023 167   0.013 320   0.021 260
DCP 4    .049      1.056     1.788 359   0.261 280   0.007  67   0.023 180   0.009 128   0.039 350   0.014  81   0.013 266   0.021 319
DCP 5    .074      1.019     1.450 356   0.199 282   0.034 233   0.008 177   0.001 316   0.035 296   0.019  99   0.003 [illegible]   0.009 288
DCP 6    .099      0.938     1.194 357   0.159 296   0.013 313   0.023 161   0.011 270   0.004 339   0.015 133   0.010  11   0.021 324
DCP 7    .149      0.794     0.902   1   0.117 310   0.006 342   0.012 270   0.016 341   0.011  16   0.023 155   0.002 193   0.011 280
DCP 8    .200      0.576     0.729  13   0.113 326   0.035 331   0.010 156   0.018 355   0.011 287   0.007 131   0.007 215   0.004   7
DCP 9    .250      0.487     0.631  12   0.111 301   0.012 103   0.015 297   0.001 313   0.007 357   0.003 197   0.008 198   0.013 286
DCP10    .300      0.446     0.541  14   0.091 309   0.012 144   0.011 219   0.004 197   0.005 191   0.012 168   0.004 263   0.010  38
DCP11    .399      0.366     0.438  36   0.090 344   0.008  53   0.015 269   0.012  23   0.013 334   0.020 245   0.005 147   0.016  40
DCP12    .501      0.280     0.362  41   0.076 350   0.006   9   0.018 241   0.007 322   0.005 191   0.011 276   0.013 179   0.006 105
DCP13    .600      0.257     0.307  56   0.058 354   0.012 135   0.018 259   0.008 202   0.012 323   0.010 309   0.016 175   0.011  64
DCP14    .701      0.282     0.261  64   0.038   6   0.036 164   0.019 231   0.018 183   0.038 145   0.015 356   0.004 181   0.005 206
DCP15    .800      0.145     0.189  66   [illegible]  34   0.010 212   0.014 215   0.004 196   0.006 209   0.008  59   0.013  90   0.006  58
DCP16    .900     -0.399     0.100 130   0.008  86   0.011  29   0.008 222   0.008 282   0.016 138   0.010  44   0.009 217   0.015 147
DCP17    .969     -0.060     0.041 154   0.018 265   0.017  87   0.013 358   0.009 147   0.007 282   0.002 182   0.004  50   0.010 279

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         88.28       0.338       0.393       6.66        0.0         4.95      12089.3       20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
            132.9       17093.      0.23E 07    -0.069      1.118       12.95       -0.00093    1.953       0.0
           (435.9)     (357.0)
                                                            HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.948     6.663   0   1.207 305   0.070 215   0.076  98   0.059 357   0.012  60   0.048   1   0.013 231   0.006 162
CN                 0.631     0.665  17   0.072 335   0.003  62   0.006 282   0.019 321   0.001 151   0.003 268   0.002 155   0.002 273
CM                -0.001     0.058 295   0.021 216   0.003 210   0.004  72   0.002 152   0.001 196   0.003 136   0.002 342   0.000 149

DCP 1    .010      2.665     3.259 341   0.401 265   0.039 222   0.065 158   0.083  76   0.067 323   0.036 186   0.020 116   0.021 269
DCP 2    .020      2.431     2.991 353   0.634 266   0.194 191   0.051 118   0.060 157   0.069  61   0.063 307   0.061 183   0.051  12
DCP 3    .030      2.095     2.301 351   0.322 290   0.128 149   0.166  53   0.146 309   0.105 219   0.079 142   0.026  44   0.007 347
DCP 4    .049      1.926     1.775 356   0.223 277   0.020 239   0.032  77   0.067 312   0.058 213   0.067 107   0.066 351   0.039 261
DCP 5    .074      1.712     1.403 356   0.175 287   0.020 266   0.012 120   0.023 306   0.026 196   0.033 106   0.022 312   0.023 196
DCP 6    .099      1.527     1.161   0   0.143 290   0.018 288   0.039  85   0.010 265   0.013 195   0.028 120   0.013 306   0.011 201
DCP 7    .149      1.198     0.873   3   0.137 288   0.015  39   0.010 150   0.014 353   0.019  93   0.004 129   0.012 136   0.011 308
DCP 8    .200      0.956     0.718  15   0.190 317   0.010 351   0.008 339   0.001 215   0.017 148   0.013 294   0.038   0   0.012 135
DCP 9    .250      0.794     0.665  13   0.137 326   0.037 360   0.028 336   0.017 231   0.003   7   0.011 252   0.010  87   0.020 337
DCP10    .300      0.701     0.536  16   0.086 329   0.007 277   0.027 299   0.010 303   0.003  75   0.017 170   0.006 187   0.003 117
DCP11    .399      0.578     0.440  37   0.066  10   0.018   4   0.010 289   0.009  16   0.011  33   0.019 242   0.004 200   0.036 143
DCP12    .501      0.431     0.377  46   0.098   1   0.099 137   0.012 314   0.009  12   0.009 330   0.013 276   0.006 164   0.005 239
DCP13    .600      0.363     0.322  57   0.083  20   0.019  78   0.020 254   0.010 286   0.007  83   0.023 317   0.010 204   0.010   1
DCP14    .701      0.351     0.251  69   0.088  13   0.010  77   0.022 213   0.021 319   0.007 141   0.016 335   0.006 181   0.003 102
DCP15    .800      0.175     0.181  88   0.066  18   0.012 356   0.015 179   0.009 333   0.035  58   0.005  80   0.008  92   0.036 106
DCP16    .900     -0.082     0.104  93   0.053  90   0.013  20   0.006 127   0.008 265   0.014 266   0.015 325   0.034 183   0.005 273
DCP17    .969     -0.379     0.061 149   0.326  98   0.037  36   0.032 301   0.015  37   0.039  96   0.008 135   0.007 134   0.039 255
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0       87.77      0.334      0.396      6.65        0.0        7.40      12089.4      20

               V         Q          RN         CN(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP  TDR        EXT DAMP
                133.6     17323.     0.23E 07  -0.058      1.391       15.22     -0.00010    0.341      0.0
               (438.4)   (361.8)
                                                     HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.403    6.651   0   1.393 299   0.076 214   0.063 148   0.050 344   0.017  28   0.065 352   0.017 222   0.004  82
CN                  0.762    0.582  20   0.048 256   0.040   6   0.032 224   0.006  61   0.007  74   0.007 291   0.002 262   0.008 145
CM                 -0.009    0.029 253   0.041 332   0.021 178   0.006  31   0.002 215   0.000 332   0.002  93   0.001 233   0.003 338

DCP 1    .010       2.917    1.982       0.883   5   0.404 288   0.214 219   0.160 173   0.100 112   0.082  52   0.029 333   0.034 343
DCP 2    .020       2.653    1.990  [illegible]   0.888   8   0.443 304   0.259 260   0.216 219   0.111 156   0.053 152   0.365  89   0.039 354
DCP 3    .030       2.465    1.73   10   0.723 351   0.373 258   0.196 168   0.158 157   0.172  85   0.095  34   0.102   0   0.077 311
DCP 4    .049       2.207    1.46   17   0.610 346   0.193 262   0.131 223   0.137 142   0.116  43   0.045  18   0.083 320   0.086 244
DCP 5    .074       1.992    1.445  17   0.519 333   0.152 226   0.104 195   0.120 104   0.107  10   0.042 334   0.068 264   0.061 172
DCP 6    .099       1.811    1.252  19   0.463 332   0.145 200   0.092 189   0.140  84   0.109 348   0.026 284   0.070 242   0.052 159
DCP 7    .149       1.489    1.170  13   0.346 279   0.122 162   0.092 138   0.152  26   0.139 285   0.068 190   0.082 159   0.076  70
DCP 8    .200       1.267    [illegible]  18   0.242 278   0.128 147   0.076 108   0.151  17   0.095 279   0.086 209   0.050 [illegible]   0.074  59
DCP 9    .250       [illegible]    0.927   4   0.258 216   0.141  46   0.061  13   0.109 304   0.100 197   0.082 122   0.069 [illegible]   0.065 300
DCP10    .300       0.984    [illegible]   4   0.219 [illegible]   [illegible]  62   0.079 328   0.122 [illegible]   0.089 143   0.051  44   0.147 [illegible]   0.034 220
DCP11    .399       0.794    0.446  2[illegible]   0.191 [illegible]   [illegible]  59   0.090 311   0.137 25[illegible]   0.083 140   0.061  10   0.044 130   0.036 172
DCP12    .501       [illegible]    0.467   5   0.152 [illegible]   [illegible]   0.096 266   0.070 197   0.096 [illegible]   0.039 298   0.040 169   0.023  83
DCP13    .600       0.454    0.347  40   0.129 156   0.143   5   0.074 223   0.045 117   0.062   4   0.075 251   0.052 117   0.024   0
DCP14    .721       0.384    0.272  55   0.125 [illegible]   0.139 310   0.069 182   0.042  74   0.034 289   0.016 196   0.027  31   0.025 217
DCP15    .800       0.233    0.170  59   0.110 115   0.094 338   0.042 155   0.079  52   0.022 254   0.010  71   0.018  19   0.023 177
DCP16    .900      -0.056    0.069  26   0.075 110   0.066 297   0.033 136   0.027   3   0.010 197   0.021  92   0.026 286   0.023 114
DCP17    .969      -0.068    0.019 348   0.061 157   0.038 337   0.025 250   0.019  23   0.004 190   0.016 134   0.028 320   0.012 168

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0       88.48      0.332      0.401      6.53        0.0        9.89      12091.1      20

                         Q          RN         CN(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP  TDR        EXT DAMP
                135.8     17950.     0.24E 07  -0.174      1.604       16.00      0.00033   -0.342      0.0
               (445.5)   (374.9)
                                                     HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               9.888    6.625   0   1.609 302   0.091 212   0.082 169   0.036 339   0.013  35   0.064   1   0.022 203   0.003 104
CN                  0.937    0.632  20   0.038 312   0.035  23   0.027 307   0.015 177   0.013 288   0.009 156   0.013 102   0.005   9
CM                 -0.042    0.050 170   0.047 329   0.024 231   0.017 146   0.008   7   0.003 153   0.006 148   0.004 325   0.003 124

DCP 1    .010       2.994    1.761  44   0.997  13   0.296 347   0.244 298   0.091 265   0.114 263   0.073 192   0.046 179   0.034 104
DCP 2    .020       2.763    1.445  48   0.984  26   0.386   5   0.295 330   0.105 311   0.126 304   0.058 240   0.039 273   0.038 178
DCP 3    .030       2.614    1.304  41   0.799  10   0.294 332   0.302 283   0.162 234   0.166 229   0.161 185   0.089 160   0.105 138
DCP 4    .049       2.497    1.266  31   0.492   1   0.192 349   0.231 285   0.117 209   0.093 199   0.128 130   0.048  79   0.067  87
DCP 5    .074       2.271    1.240  28   0.425 344   0.181 332   0.245 255   0.131 170   0.086 156   0.123  96   0.063  22   0.047  35
DCP 6    .099       2.078    1.199  28   0.377 334   0.168 324   0.251 243   0.138 159   0.085 127   0.099  82   0.072  19   0.092 352
DCP 7    .149       1.652    1.187  25   0.381 306   0.109 270   0.272 211   0.147 122   0.127  76   0.083  20   0.056 338   0.061 275
DCP 8    .200       1.412    1.092  31   0.373 308   0.171 257   0.183 183   0.131 123   0.120  73   0.090 351   0.058 322   0.059 257
DCP 9    .250       1.292    1.019  19   0.300 299   0.176 217   0.197 127   0.122  43   0.106 344   0.092 250   0.056 189   0.062 149
DCP10    .300       1.162    0.916  15   0.240 281   0.166 197   0.203  99   0.140  10   0.131 295   0.110 206   0.066 130   0.072  82
DCP11    .399       1.042    0.810  17   0.147 265   0.124 173   0.193  87   0.148 359   0.153 285   0.126 209   0.098 118   0.053  55
DCP12    .501       0.836    0.662  11   0.181 191   0.126 107   0.196  35   0.154 288   0.123 213   0.102 123   0.072  39   0.057 301
DCP13    .600       0.694    0.495  11   0.210 163   0.161  66   0.187 344   0.144 234   0.078 152   0.099  54   0.078 300   0.040 204
DCP14    .721       0.552    0.337  10   0.220 140   0.182  35   0.165 303   0.116 183   0.072  68   0.072 337   0.066 211   0.031  94
DCP15    .800       0.318    0.188   3   0.195 127   0.146  23   0.146 278   0.112 135   0.063 353   0.039 309   0.059 145   0.037 343
DCP16    .900       0.037    0.112 338   0.135  95   0.097 356   0.093 247   0.055 109   0.021 314   0.018 249   0.031  73   0.029 256
DCP17    .969      -0.036    0.032 339   0.065  59   0.052  10   0.030 231   0.029 176   0.019  20   0.022 286   0.012  60   0.020 304
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                         FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0         88.26       0.331       0.401       6.56        0.0         13.89       12091.2     20

                V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                 135.7       17960.      0.24E 07   -0.257       1.954       21.37       0.00110    -1.270       0.0
                (445.1)     (375.1)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              13.889   6.564   0   1.815 304   0.105 232   0.082 190   0.042  15   0.011 329   0.077 355   0.022 237   0.004  98
CN                  1.185   0.678  23   0.059 337   0.030  39   0.044 276   0.027  68   0.017 183   0.029   2   0.015 264   0.005 206
CM                 -0.084   0.128 156   0.041 354   0.015 264   0.005  81   0.016 209   0.012  25   0.009 169   0.004  57   0.003 292

DCP 1     .010      3.174   1.848 105   0.510  43   0.414  80   0.095 130   0.107  90   0.074  95   0.036  40   0.045  75   0.023 253
DCP 2     .020      2.994   1.837 104   0.581  65   0.413 101   0.162 149   0.059 117   0.121 128   0.023 113   0.069 120   0.028 205
DCP 3     .030      2.791   1.487  91   0.532  46   0.420  57   0.176  64   0.158  47   0.135  79   0.087  64   0.098  83   0.038  64
DCP 4     .049      3.061   1.050  57   0.199  31   0.299  67   0.155  21   0.118 355   0.077  19   0.085 350   0.058 359   0.074 330
DCP 5     .074      2.808   1.074  42   0.112  24   0.324  45   0.197 343   0.129 312   0.064   2   0.110 314   0.054 286   0.055 284
DCP 6     .099      2.591   1.110  38   0.091  11   0.341  35   0.249 330   0.149 293   0.049 332   0.102 306   0.084 268   0.046 254
DCP 7     .149      1.927   1.188  48   0.448 344   0.170 320   0.184 323   0.188 265   0.068 224   0.072 238   0.060 207   0.070 189
DCP 8     .200      1.641   1.154  52   0.449 346   0.162 310   0.206 311   0.180 251   0.097 235   0.085 196   0.084 191   0.057 168
DCP 9     .250      1.480   1.075  37   0.468 342   0.216 280   0.224 253   0.191 184   0.113 147   0.100 104   0.061  72   0.065  29
DCP10     .300      1.362   0.995  30   0.402 335   0.253 257   0.189 219   0.175 145   0.123 133   0.084  52   0.064  16   0.048 320
DCP11     .399      1.310   0.954  23   0.282 337   0.259 250   0.135 209   0.232 145   0.148  81   0.100  45   0.094   0   0.081 309
DCP12     .501      1.164   0.935   4   0.157 247   0.133 202   0.164 170   0.284  79   0.142 339   0.081 347   0.143 266   0.097 188
DCP13     .600      1.011   0.855 354   0.277 206   0.167 126   0.070 119   0.267  41   0.188 280   0.016 249   0.079 201   0.077 121
DCP14     .701      0.770   0.621 347   0.284 175   0.212  91   0.097 358   0.140 340   0.148 210   0.030 349   0.053 124   0.040  21
DCP15     .800      0.500   0.428 336   0.246 164   0.219  68   0.143 321   0.057 296   0.094 171   0.069 354   0.028 277   0.023 101
DCP16     .900      0.175   0.255 317   0.169 108   0.125   8   0.045 288   0.077 284   0.076 127   0.033 292   0.010 126   0.015  14
DCP17     .969      0.027   0.104 313   0.110  88   0.093 359   0.029 145   0.054 340   0.042 185   0.071 308   0.008   3   0.026 216
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                         FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0         87.93       0.333       0.398       6.56        0.0         14.90       12091.3     20

                V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                 134.6       17653.      0.24E 07   -0.310       2.012       21.73       0.00118    -1.355       0.0
                (441.6)     (368.7)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              14.903   6.562   0   1.756 305   0.098 209   0.041 182   0.045   8   0.019 319   0.069 358   0.024 238   0.003 268
CN                  1.255   0.689  25   0.024  36   0.037  81   0.074 277   0.034  92   0.022 170   0.019  38   0.006 299   0.010 294
CM                 -0.100   0.145 159   0.053 353   0.020 271   0.015  59   0.022 230   0.010  39   0.006 188   0.007  81   0.003 107

DCP 1     .010      3.195   1.975 113   0.277  73   0.348 131   0.249 156   0.075 155   0.087 122   0.023 195   0.040  75   0.043 160
DCP 2     .020      3.054   1.937 113   0.369  99   0.357 125   0.292 175   0.090 227   0.102 155   0.071 232   0.021 155   0.055 212
DCP 3     .030      2.803   1.562  98   0.452  72   0.380  74   0.223 119   0.115 111   0.159 121   0.076 147   0.078 139   0.067 179
DCP 4     .049      3.164   1.335  65   0.129  61   0.252  79   0.151  78   0.073  15   0.123  84   0.074  59   0.078  65   0.051  76
DCP 5     .074      2.909   1.021  49   0.096  76   0.270  53   0.153  30   0.083 340   0.101  56   0.065  25   0.071  21   0.044  21
DCP 6     .099      2.674   1.067  42   0.062  69   0.298  48   0.200   6   0.084 325   0.092  39   0.083   1   0.058 350   0.048 353
DCP 7     .149      1.994   1.197  55   0.440 351   0.078 333   0.230   1   0.155 296   0.052 306   0.058 301   0.061 261   0.055 262
DCP 8     .200      1.711   1.154  55   0.421 353   0.110 338   0.217 340   0.163 290   0.084 255   0.070 286   0.050 239   0.070 286
DCP 9     .250      1.595   1.105  41   0.462   3   0.180 296   0.259 303   0.173 221   0.123 197   0.085 163   0.105 143   0.045 152
DCP10     .300      1.445   0.991  34   0.406 358   0.251 271   0.231 262   0.166 189   0.142 147   0.089 109   0.064  99   0.052  61
DCP11     .399      1.384   0.967  27   0.259   3   0.232 263   0.248 269   0.242 178   0.146 138   0.104 114   0.091  74   0.064  11
DCP12     .501      1.229   0.952   7   0.174 271   0.152 199   0.183 233   0.292 116   0.127  33   0.099  17   0.089 330   0.095 257
DCP13     .600      1.078   0.961 358   0.272 215   0.208 139   0.110 204   0.293  77   0.159 324   0.059 312   0.078 284   0.072 194
DCP14     .701      0.869   0.730 349   0.332 190   0.251 136   0.010 335   0.191  72   0.137 247   0.019 180   0.036 235   0.042  58
DCP15     .800      0.570   0.512 335   0.336 170   0.251  76   0.098 303   0.092   2   0.107 191   0.057  21   0.041 266   0.023 357
DCP16     .900      0.221   0.391 316   0.278 127   0.147  15   0.064 180   0.121 324   0.072 139   0.042 320   0.044 193   0.012 267
DCP17     .969      0.062   0.118 310   0.209 125   0.133 357   0.028 162   0.064 355   0.039 234   0.009 120   0.004 168   0.030 300
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                              FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ    K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0         22.59       0.068        0.505        5.14        0.0          0.00        12035.1       20

                 V           Q           RN           CN(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  169.3       74439.      0.79E 07    -0.037        0.653        5.00       -0.00076      1.032        0.0
                 (555.4)     (1554.7)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                0.003   5.142   0   0.213   9   0.037 259   0.006 197   0.028 351   0.035 136   0.019 274   0.046 323   0.005 248
CN                   0.126   0.523 354   0.009 324   0.007 289   0.002 244   0.004 321   0.002 145   0.005 340   0.011 335   0.001 144
CM                  -0.016   0.015 318   0.002  26   0.002 116   0.001 158   0.000 184   0.000  53   0.001 179   0.003 149   0.000 344

DCP 1     .010      -0.669   3.295 348   0.118 274   0.252 317   0.219  36   0.116 108   0.046 164   0.016  42   0.041 157   0.040 238
DCP 2     .020      -0.380   2.633 351   0.059 319   0.034 303   0.018  19   0.018  88   0.052 177   0.061 285   0.048 354   0.023  75
DCP 3     .030      -0.142   2.379 350   0.090  35   0.078 155   0.063 226   0.038 316   0.020 138   0.033 278   0.034 347   0.027  61
DCP 4     .049       0.149   1.965 350   0.065  20   0.081 145   0.072 217   0.055 296   0.024  38   0.008  20   0.008 342   0.012  54
DCP 5     .074       0.311   1.580 350   0.043 356   0.034 138   0.039 206   0.039 288   0.018  15   0.016  32   0.005  87   0.004 240
DCP 6     .099       0.388   1.312 351   0.031 334   0.002  71   0.018 205   0.018 288   0.006  35   0.009 358   0.004  48   0.005 225
DCP 7     .149       0.265   0.960 351   0.020 321   0.009 300   0.003 172   0.005 298   0.003 128   0.008 346   0.001 330   0.002 225
DCP 8     .200       0.209   0.784 354   0.018 320   0.012 316   0.002  50   0.002 340   0.005 167   0.007 342   0.006 357   0.003 128
DCP 9     .250       0.189   0.678 353   0.016 335   0.009 288   0.002 227   0.006 307   0.005 181   0.004 323   0.011 327   0.002 217
DCP10     .300       0.197   0.570 353   0.012 336   0.008 292   0.001 259   0.004 329   0.001 251   0.005 333   0.009 322   0.002 221
DCP11     .399       0.181   0.457 358   0.008 338   0.007 297   0.000  42   0.004 339   0.002 174   0.005  15   0.016 329   0.001  85
DCP12     .501       0.128   0.343 359   0.005 327   0.010 299   0.003 331   0.003  26   0.006 165   0.004   0   0.012 339   0.002 111
DCP13     .600       0.142   0.258   1   0.005 280   0.009 302   0.002 324   0.002  61   0.002 160   0.004 290   0.013 340   0.001 156
DCP14     .701       0.208   0.179   2   0.003 196   0.008 296   0.000 336   0.004 338   0.001 147   0.003 331   0.014 336   0.003 160
DCP15     .800       0.094   0.100   7   0.006 207   0.010 300   0.002 277   0.003   0   0.001 273   0.003 309   0.014 326   0.002 229
DCP16     .900      -0.091   0.019  40   0.013 230   0.008 278   0.004 333   0.004 314   0.000 284   0.007 355   0.012 320   0.003 341
DCP17     .969      -0.047   0.027 175   0.007 218   0.007 272   0.001 260   0.003 303   0.001 320   0.003  81   0.013 339   0.004 134
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                              FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ    K            MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0         22.67       0.069        0.502        5.16        0.0          2.45        12035.2       20

                 V           Q           RN           CN(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  167.8       73621.      0.79E 07    -0.027        0.929        7.69       -0.00075      1.008        0.0
                 (550.6)     (1537.6)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                2.447   5.157   0   0.228   9   0.051 263   0.006 214   0.020  17   0.018  55   0.029 188   0.065 179   0.005 305
CN                   0.396   0.531 353   0.024   0   0.005 311   0.001 247   0.002 269   0.001  69   0.001 249   0.018 186   0.002  69
CM                  -0.009   0.015 321   0.004 253   0.001 170   0.000 119   0.000  78   0.000 256   0.000  85   0.005  20   0.000 158

DCP 1     .010       1.132   3.595 348   0.165 311   0.130 145   0.011 144   0.022 184   0.038  28   0.032 305   0.041 175   0.014  91
DCP 2     .020       1.073   2.891 350   0.213 288   0.139 164   0.106  66   0.061 318   0.020 209   0.021 338   0.060 206   0.050 125
DCP 3     .030       1.140   2.438 350   0.162 288   0.098 163   0.119  60   0.120 321   0.103 228   0.077 130   0.029  63   0.007  54
DCP 4     .049       1.157   1.913 350   0.079   1   0.096 328   0.087 239   0.066 147   0.053  44   0.032 310   0.034 181   0.009  75
DCP 5     .074       1.135   1.598 350   0.069 332   0.022 303   0.015 236   0.009 154   0.003 104   0.004 304   0.019 162   0.003 101
DCP 6     .099       1.063   1.327 351   0.057 347   0.018 309   0.007 251   0.004 179   0.001  72   0.002 133   0.018 157   0.001   8
DCP 7     .149       0.756   0.970 351   0.042 358   0.013 302   0.005 242   0.002 198   0.001 103   0.002 136   0.014 156   0.002 340
DCP 8     .200       0.608   0.793 354   0.039   6   0.011 319   0.002 236   0.002 210   0.002   7   0.001 162   0.016 166   0.002  46
DCP 9     .250       0.530   0.677 353   0.035  15   0.011 314   0.002 265   0.001 208   0.000 133   0.001 340   0.018 181   0.002  84
DCP10     .300       0.486   0.564 353   0.032  17   0.010 319   0.002 250   0.002 272   0.001 112   0.002 130   0.014 173   0.002  26
DCP11     .399       0.410   0.452 357   0.027  27   0.007 347   0.001 263   0.002 293   0.001  28   0.002 231   0.023 196   0.003  34
DCP12     .501       0.300   0.345 358   0.021  27   0.005 325   0.002 308   0.003 320   0.000  81   0.003 273   0.017 202   0.002  98
DCP13     .600       0.273   0.261   0   0.018  32   0.006 314   0.002 209   0.002 293   0.003  62   0.001 201   0.020 200   0.001  84
DCP14     .701       0.298   0.174   1   0.020  42   0.002 332   0.002 323   0.001 268   0.002  17   0.000 199   0.018 196   0.001 103
DCP15     .800       0.139   0.099   5   0.013  54   0.004 359   0.001 171   0.001 245   0.003  89   0.001 295   0.019 197   0.003 300
DCP16     .900      -0.085   0.029  12   0.004  11   0.004   9   0.002  43   0.003 276   0.002 155   0.001 253   0.022 191   0.001  31
DCP17     .969      -0.059   0.021 183   0.003 348   0.001 298   0.002 100   0.003 149   0.002  43   0.002 355   0.017 201   0.002  77
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                  0.0       22.80      0.070      0.499      5.17       0.0          4.93      12035.3      20

                V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                 166.7      72893.     0.79E 07  -0.020      1.148      10.14      -0.00098     1.304       0.0
                (547.0)    (1522.4)                                HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA                4.928    5.167   0  0.218  10  0.052 267  0.013 234  0.017  74  0.029  25  0.043 177  0.015 107  0.004 301
CN                   0.643    0.481 357  0.063  13  0.023 260  0.012 114  0.008 337  0.005 230  0.003 135  0.002  71  0.003  58
CM                   0.001    0.024 329  0.006 239  0.001  25  0.003 241  0.003 127  0.002  17  0.001 261  0.001 189  0.000 276

DCP 1    .010        2.656    3.018 349  0.359  39  0.298 324  0.178 224  0.039 104  0.036 269  0.020 204  0.045 181  0.037  95
DCP 2    .020        2.474    2.834 352  0.180 346  0.154 325  0.185 241  0.106 142  0.028 305  0.059 156  0.011  99  0.046 124
DCP 3    .030        2.436    2.599 352  0.221 309  0.049 291  0.120 249  0.121 158  0.033  55  0.060 146  0.072  51  0.017 312
DCP 4    .049        2.295    2.161 353  0.206 329  0.100 294  0.125 244  0.154 161  0.132  62  0.063 309  0.035 132  0.056 350
DCP 5    .074        1.874    1.459 355  0.253   4  0.164 263  0.098 148  0.041  60  0.024  83  0.053  17  0.054 287  0.024 227
DCP 6    .099        1.643    1.147 354  0.183  23  0.091 270  0.074 142  0.065  47  0.052 330  0.034 270  0.039 218  0.026 159
DCP 7    .149        1.191    0.841 354  0.112  28  0.034 285  0.021 104  0.021   6  0.018 285  0.012 216  0.012 170  0.009  72
DCP 8    .200        1.004    0.772 357  0.077 340  0.062 196  0.061  86  0.047 352  0.032 267  0.018 186  0.013 156  0.013  76
DCP 9    .250        0.881    0.674 355  0.058 316  0.064 163  0.066  54  0.055 314  0.036 223  0.022 147  0.018  84  0.017  20
DCP10    .300        0.768    0.537 356  0.052 344  0.039 172  0.044  59  0.038 310  0.026 213  0.018 126  0.013  41  0.009 333
DCP11    .399        0.618    0.401   1  0.052  21  0.011 221  0.017  63  0.018 302  0.012 184  0.007  82  0.004  18  0.002  73
DCP12    .501        0.446    0.284   5  0.057  33  0.016 281  0.008  95  0.010 302  0.009 191  0.006  94  0.004  14  0.000 268
DCP13    .600        0.369    0.195  10  0.063  38  0.027 287  0.011 143  0.007 354  0.006 208  0.006  73  0.004 336  0.002 128
DCP14    .701        0.348    0.103  23  0.068  43  0.028 288  0.012 144  0.008   0  0.006 232  0.004 105  0.003  16  0.002  67
DCP15    .800        0.164    0.056  37  0.044  46  0.014 278  0.008 102  0.009 315  0.007 218  0.002 185  0.003 356  0.003 131
DCP16    .900       -0.071    0.029  28  0.012 340  0.009 158  0.011  41  0.009 263  0.006 126  0.004   8  0.001 335  0.001  79
DCP17    .969       -0.065    0.005 149  0.013 260  0.007 159  0.006  45  0.005 293  0.002 164  0.002 256  0.004  53  0.002  31
                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                  0.0       22.38      0.069      0.498      5.14       0.0          7.39      12035.4      20

                V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                 166.0      72366.     0.79E 07  -0.049      1.262      11.52      -0.00122     1.623       0.0
                (544.6)    (1511.4)                                HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA                7.389    5.143   0  0.192  28  0.048 331  0.016 339  0.054 328  0.046 212  0.065 100  0.105 293  0.018 239
CN                   0.801    0.297  10  0.154  45  0.054 330  0.023 285  0.022 230  0.017 153  0.012  56  0.025 324  0.004 317
CM                   0.000    0.018 287  0.015 117  0.012  15  0.004 323  0.005 320  0.005 247  0.003 175  0.011 121  0.001  78

DCP 1    .010        3.545    1.634 347  1.077  70  0.430 352  0.105 349  0.083 309  0.039 273  0.030 149  0.102  40  0.009 256
DCP 2    .020        3.202    1.590 351  0.936  78  0.563 359  0.110 323  0.184 322  0.079 252  0.049 262  0.099  80  0.042 303
DCP 3    .030        3.086    1.530 350  0.733  81  0.511   7  0.142 322  0.207 325  0.121 255  0.094 286  0.062 157  0.040 308
DCP 4    .049        2.731    1.033 352  0.804  77  0.469   1  0.077 322  0.221 344  0.195 257  0.008  13  0.052 258  0.039 235
DCP 5    .074        2.253    0.733   7  0.535  55  0.197   5  0.159 328  0.092 274  0.085 252  0.044 178  0.016 332  0.060 194
DCP 6    .099        1.995    0.620   7  0.420  51  0.140 342  0.099 308  0.095 242  0.062 193  0.042 149  0.052  97  0.022 124
DCP 7    .149        1.495    0.528   7  0.293  44  0.126 330  0.084 276  0.076 216  0.060 160  0.043 100  0.043  70  0.016  54
DCP 8    .200        1.246    0.503  11  0.228  36  0.102 319  0.072 275  0.074 221  0.063 164  0.045  99  0.044  78  0.023  55
DCP 9    .250        1.111    0.484  11  0.195  19  0.095 295  0.067 243  0.071 193  0.064 130  0.048  72  0.039 353  0.034 355
DCP10    .300        0.961    0.387  11  0.153  21  0.061 298  0.045 257  0.056 198  0.054 126  0.039  56  0.035 331  0.022 347
DCP11    .399        0.772    0.296  18  0.125   8  0.043 294  0.024 256  0.036 203  0.035 127  0.026  53  0.047 325  0.013 337
DCP12    .501        0.562    0.208  24  0.100  30  0.029 277  0.008 222  0.017 189  0.021 101  0.017  23  0.042 312  0.010 266
DCP13    .600        0.446    0.141  37  0.090  30  0.024 261  0.005 149  0.011 183  0.018  88  0.014  10  0.040 303  0.006 266
DCP14    .701        0.391    0.086  69  0.074  29  0.022 217  0.014  86  0.004 193  0.013  69  0.013 338  0.038 297  0.004 212
DCP15    .800        0.205    0.071  55  0.042 350  0.026 197  0.011 110  0.010 141  0.015  43  0.011 330  0.036 299  0.002 241
DCP16    .900       -0.039    0.066  24  0.037 299  0.018 195  0.012 179  0.016 114  0.011  31  0.006 318  0.040 299  0.005 173
DCP17    .969       -0.059    0.024  20  0.027 285  0.007 196  0.007 199  0.007 113  0.004  63  0.003 309  0.035 308  0.002 171
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                         FORCED  PITCHING  OSCILLATION         AIRFOIL     NLR 1

             TUNED HZ   DRIVE HZ    K            MACH NO    DEL.ALPHA   DEL.H         ALPHA.O      TEST POINT  CYCLES ANALYSED
               0.0        22.77      0.071        0.493      5.02        0.0            9.88       12035.5      20

             V          Q           RN           CN(MIN)    CN(MAX)     ALPHA.NMAX    AERO DAMP    TOR         EXT DAMP
              164.1     69857.       0.77E 07    -0.071      1.350       11.96        -0.00138      1.811       0.0
             (538.4)   (1459.0)
                                                                  HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                9.881    5.015   0    0.247  27    0.034 265    0.033  88    0.042  58    0.113  35    0.148 244    0.036 268    0.018 147
CN                   0.932    0.176  47    0.132  52    0.046  81    0.040  18    0.019 350    0.018 307    0.016 240    0.014 287    0.010 185
CM                  -0.010    0.034 218    0.027 100    0.002 172    0.012  94    0.004  60    0.007  64    0.005  19    0.002  87    0.004 332

DCP 1      .010      3.937    0.306 184    1.267  72    0.201 125    0.223  80    0.084  12    0.044 127    0.053 318    0.020 266    0.035 317
DCP 2      .020      3.552    0.104 215    1.294  79    0.144 137    0.367  80    0.104  82    0.059 113    0.077  28    0.045 213    0.064 327
DCP 3      .030      3.486    0.243 320    1.043  85    0.113 122    0.400  85    0.137  93    0.119  74    0.118  78    0.061 233    0.034  31
DCP 4      .049      3.017    0.150 161    0.866  79    0.192 152    0.377  82    0.074 168    0.241  74    0.060 171    0.074  67    0.069 133
DCP 5      .074      2.510    0.289  95    0.467  75    0.245  96    0.154  77    0.120  56    0.097  74    0.040  39    0.057  91    0.023  96
DCP 6      .099      2.231    0.231  77    0.366  65    0.147  87    0.115  41    0.093  20    0.068   0    0.039 345    0.044   0    0.042 353
DCP 7      .149      1.706    0.265  54    0.289  53    0.089  58    0.096  15    0.065 341    0.050 334    0.043 299    0.039 303    0.019 284
DCP 8      .200      1.435    0.301  49    0.251  54    0.110  52    0.108  14    0.078 351    0.068 334    0.053 301    0.049 310    0.031 277
DCP 9      .250      1.307    0.342  36    0.189  40    0.105  39    0.103 349    0.075 333    0.078 304    0.059 269    0.066 270    0.046 222
DCP10      .300      1.138    0.305  35    0.135  32    0.070  45    0.071 348    0.055 333    0.063 292    0.041 242    0.041 264    0.036 203
DCP11      .399      0.917    0.259  40    0.095  24    0.045  74    0.054 354    0.032 332    0.043 292    0.035 243    0.022 273    0.017 204
DCP12      .501      0.684    0.215  44    0.072   4    0.030  91    0.037 335    0.014 312    0.032 276    0.029 216    0.011 269    0.018 182
DCP13      .600      0.535    0.166  51    0.059 336    0.024 124    0.038 302    0.018 236    0.037 249    0.038 193    0.008 232    0.025 164
DCP14      .701      0.456    0.129  67    0.059 313    0.031 120    0.031 295    0.012 190    0.018 230    0.018 169    0.005 333    0.014 133
DCP15      .800      0.265    0.128  44    0.063 297    0.007  68    0.036 267    0.012 182    0.018 226    0.011 186    0.002 270    0.012 117
DCP16      .900      0.008    0.123  19    0.047 287    0.020 349    0.027 256    0.006 272    0.014 215    0.005 187    0.005 294    0.010 131
DCP17      .969     -0.045    0.058  17    0.022 293    0.015 349    0.011 286    0.008 286    0.009 229    0.005 248    0.005 307    0.007 121
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                         FORCED  PITCHING  OSCILLATION         AIRFOIL     NLR 1

             TUNED HZ   DRIVE HZ    K            MACH NO    DEL.ALPHA   DEL.H         ALPHA.O      TEST POINT  CYCLES ANALYSED
               0.0        23.06      0.070        0.503      4.95        0.0           12.38       12037.1      20

             V          Q           RN           CN(MIN)    CN(MAX)     ALPHA.NMAX    AERO DAMP    TOR         EXT DAMP
              168.8     74109.       0.79E 07    -0.089      1.287       11.61        -0.00152      2.052       0.0
             (553.9)   (1547.8)
                                                                  HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               12.381    4.948   0    0.215  20    0.048 156    0.015 167    0.040 247    0.079 183    0.036 313    0.011 182    0.002 198
CN                   0.984    0.166  89    0.030 103    0.050 122    0.030 145    0.013 121    0.018 132    0.006  21    0.002 284    0.007 152
CM                  -0.023    0.058 200    0.008 108    0.014 181    0.005 239    0.006 177    0.006 247    0.003 179    0.003 147    0.001 354

DCP 1      .010      4.058    1.217 171    0.122  85    0.405 164    0.067 170    0.096 150    0.064 216    0.044 110    0.043 259    0.036  95
DCP 2      .020      3.766    1.229 172    0.105  92    0.458 170    0.082 216    0.115 172    0.092 238    0.042 142    0.061 273    0.023 134
DCP 3      .030      3.605    1.102 178    0.179 104    0.373 175    0.118 236    0.108 191    0.083 255    0.030 215    0.067 284    0.004 174
DCP 4      .049      3.102    1.121 173    0.037 238    0.385 172    0.242 253    0.029 172    0.105 255    0.058 356    0.040 271    0.041  20
DCP 5      .074      2.472    0.538 138    0.259 133    0.291 172    0.176 211    0.114 231    0.099 268    0.106 348    0.077  63    0.059 109
DCP 6      .099      2.232    0.402 128    0.117 127    0.178 146    0.124 160    0.119 173    0.073 195    0.040 232    0.025 241    0.020 339
DCP 7      .149      1.747    0.303 103    0.092  92    0.135 118    0.072 133    0.063 122    0.053 146    0.016 155    0.024 156    0.018 237
DCP 8      .200      1.464    0.278 103    0.152 103    0.128 117    0.091 138    0.059 135    0.065 157    0.021 175    0.039 179    0.027 205
DCP 9      .250      1.342    0.281  86    0.148  87    0.127  99    0.093 112    0.071 102    0.065 124    0.033 125    0.040 164    0.034 156
DCP10      .300      1.166    0.242  73    0.094  88    0.089  92    0.067 109    0.046 102    0.050 109    0.022 126    0.025 130    0.029 150
DCP11      .399      0.982    0.238  58    0.037  73    0.045  72    0.038 132    0.023  69    0.032 113    0.009  91    0.013  88    0.013 156
DCP12      .501      0.764    0.228  49    0.011 317    0.032  54    0.029 127    0.018  29    0.030 103    0.014  31    0.011  45    0.006 146
DCP13      .600      0.617    0.204  47    0.033 267    0.031  21    0.017 140    0.021 348    0.025  92    0.019   4    0.016 338    0.004 145
DCP14      .701      0.508    0.173  45    0.056 258    0.030  19    0.013 113    0.025 335    0.023  78    0.020 334    0.016 331    0.002 197
DCP15      .800      0.321    0.182  30    0.031 271    0.038   8    0.019  38    0.018 326    0.015  46    0.012 340    0.020 318    0.002 262
DCP16      .900      0.061    0.165  15    0.017 350    0.026 348    0.018  28    0.006  29    0.016  11    0.011 343    0.019 290    0.002  93
DCP17      .969     -0.019    0.080  14    0.011  11    0.015  22    0.007  53    0.008  60    0.006  93    0.008  36    0.016 304    0.002  51
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                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0        23.01       0.070      0.500      4.96       0.0          17.33     12037.2      20

           V          Q           RN         CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TOR         EXT DAMP
            167.5     73266.       0.79E 07  -0.123      1.127      19.59      -0.00212     2.842      0.0
           (549.4)   (1530.2)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA            17.335   4.959   0  0.210   5  0.025 267  0.010 105  0.022  34  0.021  51  0.015 252  0.036 152  0.008  55
CN                0.972   0.152  88  0.006 106  0.011 241  0.009 307  0.004 291  0.005 228  0.008 283  0.003 222  0.001  49
CM               -0.066   0.052 209  0.012 260  0.004  44  0.001  91  0.001  52  0.001 348  0.001  87  0.003 316  0.001 139

DCP 1   .010      3.147   0.595 179  0.220 340  0.134 352  0.057 339  0.036 252  0.041 179  0.054 261  0.018 280  0.034 101
DCP 2   .020      2.939   0.450 175  0.195 327  0.116   8  0.036  26  0.017 306  0.028 167  0.055 291  0.027 294  0.020 139
DCP 3   .030      2.794   0.821 169  0.186 325  0.034 350  0.047  21  0.014 303  0.035 350  0.011 259  0.027 320  0.018 167
DCP 4   .049      2.184   0.483 158  0.134 266  0.033  40  0.002 355  0.031  24  0.017 298  0.026 336  0.039 306  0.013 126
DCP 5   .074      1.998   0.448 153  0.104 248  0.001 203  0.009 309  0.026   6  0.021 269  0.019 283  0.021 315  0.009  49
DCP 6   .099      1.868   0.375 143  0.089 235  0.022 223  0.009 269  0.014 302  0.024 234  0.011 298  0.020 308  0.002  41
DCP 7   .149      1.626   0.272 126  0.056 220  0.016 195  0.010 197  0.010 243  0.001 170  0.018 281  0.023 297  0.005 305
DCP 8   .200      1.449   0.208 119  0.055 235  0.017 324  0.019 315  0.014 272  0.006 319  0.011 301  0.023 305  0.021  15
DCP 9   .250      1.355   0.231 112  0.041 209  0.024 210  0.015 324  0.013 105  0.014 209  0.009 241  0.007 158  0.004 243
DCP10   .300      1.223   0.211  97  0.028 171  0.022 211  0.022 297  0.013  19  0.010 169  0.003 163  0.009 135  0.010 195
DCP11   .399      1.070   0.217  79  0.031 130  0.024 220  0.019 292  0.002 109  0.010 248  0.004 223  0.012 210  0.004  93
DCP12   .501      0.871   0.213  58  0.036  98  0.020 249  0.020 321  0.007 332  0.010 265  0.009 330  0.011 188  0.002 353
DCP13   .600      0.719   0.227  44  0.045  91  0.015 236  0.010 295  0.008 291  0.004 249  0.011 317  0.009 127  0.003 225
DCP14   .701      0.603   0.216  34  0.047  71  0.013 231  0.004 272  0.004 222  0.006 175  0.007 269  0.009 105  0.002  24
DCP15   .800      0.451   0.195  30  0.045  66  0.015 225  0.001  70  0.012 235  0.004 176  0.011 248  0.006 169  0.002 347
DCP16   .900      0.176   0.138  34  0.040  55  0.006 234  0.008 183  0.009 226  0.004 106  0.003 240  0.008 103  0.003 314
DCP17   .969      0.024   0.055  46  0.013  51  0.009 240  0.003  39  0.002 251  0.004  97  0.001 315  0.011 156  0.003 357
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                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0        22.80       0.070      0.499      4.99       0.0          19.80     12037.3      20

           V          Q           RN         CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TOR         EXT DAMP
            166.8     72917.       0.79E 07  -0.136      1.145      21.63      -0.00234     3.115      0.0
           (547.1)   (1522.9)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA            19.801   4.995   0  0.218  12  0.047 260  0.006 177  0.023  38  0.024  63  0.023 209  0.043 165  0.003 354
CN                0.989   0.149  79  0.001  92  0.008 153  0.002 356  0.008 276  0.003 335  0.004 204  0.008 268  0.002  31
CM               -0.084   0.042 223  0.009 222  0.002 281  0.002 218  0.002  56  0.002 163  0.001  26  0.002 110  0.000 245

DCP 1   .010      2.711   0.701 167  0.126  63  0.025 110  0.056 295  0.069  12  0.032 217  0.031 190  0.037 295  0.019  33
DCP 2   .020      2.509   0.586 168  0.107  75  0.038 195  0.009 323  0.052  37  0.035 204  0.014 227  0.052 279  0.021  58
DCP 3   .030      2.384   0.693 162  0.169 271  0.067 121  0.039 290  0.022  75  0.027 211  0.015 263  0.017 237  0.003 211
DCP 4   .049      2.129   0.174 125  0.098 233  0.025 211  0.013   7  0.025 144  0.023 138  0.024 160  0.017 276  0.009  51
DCP 5   .074      1.971   0.188 122  0.099 231  0.019 254  0.024 297  0.014 149  0.018 174  0.014 163  0.030 247  0.010 139
DCP 6   .099      1.874   0.165 104  0.091 224  0.021 194  0.025 265  0.011 258  0.010 231  0.014  65  0.008 261  0.010 261
DCP 7   .149      1.628   0.145  98  0.057 199  0.024 225  0.016 218  0.015 326  0.009 271  0.007  16  0.023 276  0.016  66
DCP 8   .200      1.427   0.166  91  0.038 208  0.023 258  0.036   8  0.021 316  0.004 127  0.012 334  0.007  21  0.011  81
DCP 9   .250      1.347   0.186  95  0.040 210  0.015 239  0.014 141  0.017 261  0.004 141  0.009 259  0.007 168  0.007 353
DCP10   .300      1.232   0.186  85  0.026 198  0.012 147  0.012 150  0.017 290  0.005  52  0.005 193  0.012 182  0.005 270
DCP11   .399      1.106   0.198  75  0.008  34  0.018 121  0.008  94  0.017 289  0.011  23  0.009 202  0.012 235  0.010 309
DCP12   .501      0.927   0.192  63  0.021  52  0.015 105  0.006  65  0.011 287  0.012   0  0.003 355  0.000 301  0.003 271
DCP13   .600      0.789   0.191  55  0.026  48  0.008 119  0.007  60  0.012 257  0.011   9  0.008 192  0.005 283  0.004 163
DCP14   .701      0.673   0.189  46  0.041  37  0.009  77  0.010  23  0.009 240  0.007 356  0.009 217  0.011 300  0.003 247
DCP15   .800      0.517   0.177  44  0.043  50  0.008 149  0.008 342  0.008 219  0.010 306  0.006 172  0.011 282  0.006  87
DCP16   .900      0.213   0.120  53  0.029  28  0.008 115  0.007 352  0.008 176  0.009 293  0.006 219  0.010 294  0.005  52
DCP17   .969      0.043   0.054  67  0.010   2  0.002 121  0.002 338  0.004 224  0.002 335  0.001  82  0.011 284  0.002  66
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                                  FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                  TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                   0.0           23.09         0.069         0.512         5.03          0.0           10.45         12043.1       20

                  V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
                   171.6         76326.        0.80E 07     -0.072         1.251         12.59        -0.00127       1.735         0.0
                  (562.9)       (1594.1)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                10.452     5.032   0     0.243  28     0.021 111     0.040  81     0.030   9     0.080  20     0.114 267     0.027 231     0.028 192
CN                    0.872     0.155  49     0.118  53     0.047  88     0.036  24     0.020   7     0.024 315     0.016 239     0.006 249     0.007 221
CM                   -0.012     0.032 217     0.023 102     0.002 142     0.011  97     0.003  60     0.007  61     0.004   7     0.002 351     0.002 317

DCP 1     .010        3.741     0.165 194     1.038  71     0.218 120     0.180  90     0.084  47     0.019  55     0.055 307     0.021 298     0.033 322
DCP 2     .020        3.339     0.098 247     1.095  80     0.170 124     0.301  86     0.121  87     0.033  76     0.063  17     0.033 240     0.048 318
DCP 3     .030        3.207     0.171 312     0.929  83     0.099 118     0.341  89     0.122  95     0.076  78     0.099  83     0.046 224     0.042 350
DCP 4     .049        2.743     0.232 176     0.786  82     0.214 142     0.355  84     0.049 139     0.189  68     0.062 176     0.061  64     0.049 142
DCP 5     .074        2.302     0.255 110     0.436  78     0.247  99     0.157  80     0.125  57     0.087  66     0.031  38     0.054  97     0.021 117
DCP 6     .099        2.056     0.207  93     0.340  67     0.163  95     0.126  47     0.092  22     0.077   6     0.048 338     0.026   5     0.030 346
DCP 7     .149        1.608     0.234  53     0.232  51     0.087  70     0.087  20     0.068 355     0.086 327     0.053 273     0.036 297     0.035 274
DCP 8     .200        1.354     0.265  48     0.194  51     0.096  66     0.086  20     0.067   9     0.088 338     0.053 288     0.031 300     0.033 282
DCP 9     .250        1.221     [illegible]  40     0.181  44     0.095  47     0.091 359     0.071 344     0.078 312     0.054 272     0.039 278     0.041 258
DCP10     .300        1.050     [illegible]  39     0.133  36     0.070  52     0.072 354     0.058 336     0.068 294     0.044 242     0.026 261     0.031 231
DCP11     .399        0.858     0.236  41     0.085  26     0.039  75     0.043 343     0.021 349     0.045 297     0.034 226     0.014 228     0.020 203
DCP12     .501        0.647     0.197  43     0.061  10     0.030  82     0.035 321     0.010 316     0.029 276     0.023 221     0.013 208     0.013 172
DCP13     .600        0.518     0.162  51     0.049 345     0.030 110     0.029 308     0.003 195     0.018 266     0.016 196     0.007 179     0.011 137
DCP14     .701        0.435     0.122  67     0.050 317     0.028 124     0.023 297     0.006 221     0.019 244     0.015 170     0.009 147     0.011 121
DCP15     .800        0.261     0.114  40     0.052 300     0.008 142     0.026 280     0.007 202     0.023 234     0.015 155     0.007 165     0.011  97
DCP16     .900        0.009     0.112  21     0.045 296     0.018 322     0.020 262     0.012 257     0.016 208     0.009 177     0.008 115     0.005 102
DCP17     .969       -0.039     0.056  12     0.021 302     0.014 333     0.010 265     0.008 286     0.005 228     0.003 195     0.002 166     0.002 231
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                                  FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                  TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                   0.0           23.07         0.069         0.508         4.97          0.0           12.31         12043.2       20

                  V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
                   170.0         75368.        0.80E 07     -0.075         1.276         11.96        -0.00160       2.172         0.0
                  (557.7)       (1574.1)
                                                              HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                12.307     4.965   0     0.239  19     0.069 204     0.014 224     0.014 184     0.044 211     0.040 151     0.032 142     0.009   0
CN                    0.948     0.165  94     0.046  92     0.046 115     0.033 141     0.018  96     0.012 136     0.006 102     0.007 140     0.004 100
CM                   -0.018     0.052 203     0.009 107     0.014 182     0.004 244     0.006 193     0.005 239     0.002 236     0.002 225     0.001 214

DCP 1     .010        4.135     1.010 168     0.220  67     0.322 166     0.038 157     0.085 167     0.034 223     0.041 193     0.002 193     0.009 158
DCP 2     .020        3.746     1.124 174     0.255  85     0.403 174     0.052 162     0.100 181     0.054 262     0.063 213     0.028 279     0.029 199
DCP 3     .030        3.610     0.927 177     0.234  91     0.374 176     0.059 220     0.118 192     0.059 265     0.068 207     0.027 317     0.023 226
DCP 4     .049        2.950     1.192 171     0.112  87     0.398 169     0.204 244     0.023 177     0.107 249     0.045 346     0.041 256     0.054   5
DCP 5     .074        2.340     0.633 146     0.301 123     0.259 165     0.141 202     0.085 211     0.108 268     0.088 348     0.045  59     0.041  75
DCP 6     .099        2.107     0.472 138     0.183 108     0.156 130     0.113 151     0.085 157     0.070 205     0.038 217     0.056 246     0.020 311
DCP 7     .149        1.704     0.303 108     0.149  89     0.116 113     0.087 137     0.061 116     0.049 148     0.015 152     0.035 194     0.018 187
DCP 8     .200        1.446     0.259  95     0.143  92     0.091 114     0.090 139     0.060 121     0.047 142     0.022 166     0.022 165     0.013 246
DCP 9     .250        1.309     0.253  77     0.126  89     0.097  98     0.098 118     0.062  89     0.057 128     0.040 127     0.049 150     0.029 155
DCP10     .300        1.149     0.250  66     0.081  84     0.081  92     0.073 115     0.052  84     0.043 116     0.033 114     0.033 130     0.027 133
DCP11     .399        0.949     0.224  59     0.041  88     0.056  78     0.063 127     0.036  70     0.025 114     0.022  99     0.025 120     0.016  90
DCP12     .501        0.723     0.203  52     0.006 107     0.050  55     0.018 112     0.024  34     0.021  81     0.011  27     0.013  95     0.010  50
DCP13     .600        0.571     0.183  53     0.026 265     0.034  41     0.014 151     0.019  25     0.012  75     0.008  24     0.006  19     0.002 303
DCP14     .701        0.471     0.152  56     0.047 267     0.032  12     0.011 154     0.021 357     0.010  65     0.002   0     0.015  16     0.010 304
DCP15     .800        0.[illegible]97     0.166  38     0.028 294     0.036 359     0.015  81     0.014  10     0.017  60     0.010  70     0.008  14     0.006  72
DCP16     .900        0.049     0.166  21     0.021 359     0.032 349     0.017  42     0.009   4     0.013   8     0.005  20     0.004 288     0.004   5
DCP17     .969       -0.025     0.071  19     0.013  33     0.015   2     0.010  51     0.005  58     0.006  38     0.001  18     0.002 243     0.001 247
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.O	TEST POINT	CYCLES ANALYSED
0.0	23.07	0.069	0.506	4.91	0.0	14.97	12043.3	20

V	Q	RN	CM(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
169.4 (555.7)	74990. (1566.2)	0.80E 07	-0.102	1.191	11.61	-0.00189	2.555	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.970	4.911	0	0.236	2	0.023	254	0.025	256	0.038	3	0.040	34	0.046	187	0.014	151	0.005	37
CN		0.979	0.173	102	0.050	214	0.031	267	0.007	194	0.010	224	0.001	294	0.003	178	0.001	71	0.001	77
CM		-0.036	0.065	200	0.012	254	0.005	54	0.005	282	0.004	339	0.001	11	0.001	325	0.001	251	0.000	219
DCP 1	.010	3.732	1.236	168	0.179	274	0.138	76	0.098	241	0.009	282	0.032	213	0.016	2	0.024	332	0.015	149
DCP 2	.020	3.432	1.316	173	0.345	270	0.091	68	0.145	264	0.029	355	0.027	171	0.023	263	0.008	0	0.025	207
DCP 3	.030	3.298	1.335	175	0.320	263	0.062	335	0.164	267	0.109	349	0.026	114	0.015	38	0.021	146	0.058	192
DCP 4	.049	2.794	1.112	169	0.603	263	0.198	356	0.025	200	0.060	322	0.056	97	0.059	191	0.038	249	0.012	13
DCP 5	.074	2.353	0.723	157	0.317	241	0.114	320	0.023	259	0.036	279	0.015	340	0.011	169	0.029	187	0.022	255
DCP 6	.099	2.080	0.511	146	0.201	221	0.062	280	0.025	224	0.026	259	0.015	333	0.010	23	0.018	120	0.017	191
DCP 7	.149	1.703	0.300	120	0.102	191	0.032	219	0.034	195	0.031	230	0.018	252	0.004	337	0.012	69	0.008	56
DCP 8	.200	1.482	0.307	126	0.124	214	0.081	271	0.032	352	0.011	66	0.006	73	0.012	265	0.002	287	0.006	149
DCP 9	.250	1.390	0.302	114	0.130	186	0.098	247	0.024	321	0.003	270	0.012	53	0.012	210	0.010	263	0.012	71
DCP10	.300	1.220	0.246	96	0.106	171	0.087	245	0.017	256	0.023	253	0.014	1	0.013	134	0.010	298	0.011	19
DCP11	.399	1.020	0.233	75	0.070	158	0.051	239	0.019	209	0.034	248	0.014	337	0.001	84	0.013	27	0.010	16
DCP12	.501	0.786	0.225	51	0.040	135	0.026	251	0.024	157	0.029	206	0.018	269	0.008	289	0.010	318	0.007	325
DCP13	.600	0.621	0.223	42	0.012	130	0.026	273	0.020	109	0.024	177	0.008	229	0.007	122	0.008	177	0.004	54
DCP14	.701	0.512	0.219	33	0.009	26	0.019	287	0.031	96	0.021	139	0.009	162	0.008	116	0.009	127	0.006	205
DCP15	.800	0.356	0.222	24	0.025	32	0.016	259	0.019	105	0.015	139	0.005	132	0.006	152	0.010	57	0.004	196
DCP16	.900	0.108	0.154	26	0.029	45	0.011	199	0.006	90	0.006	86	0.008	110	0.005	249	0.006	79	0.003	55
DCP17	.969	0.006	0.063	33	0.019	67	0.006	231	0.002	277	0.000	73	0.004	182	0.002	178	0.004	85	0.005	86

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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                  0.0      45.25      0.134      0.511      5.52       0.0         0.03     12039.1      20

                V         Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                 171.5     76316.     0.00E 07  -0.046      0.607       5.41     -0.00073    1.018       0.0
                (562.7)   (1593.9)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             0.028    5.518   0  0.267   3  0.082 292  0.049 328  0.010  65  0.011  51  0.037 177  0.015 179  0.001 155
CN                0.129    0.483 354  0.011  10  0.004 281  0.010 338  0.002 291  0.001 307  0.000  87  0.001  82  0.002  86
CM               -0.016    0.023 298  0.003 331  0.001  56  0.006 159  0.000  94  0.000 208  0.000  50  0.000 335  0.000  34

DCP 1    .010    -0.662    3.161 342  0.089 301  0.218 292  0.200   6  0.134  63  0.053 123  0.019  42  0.032  90  0.021 148
DCP 2    .020    -0.351    2.500 347  0.078 349  0.019 264  0.017 [illegible]  0.023  10  0.028 135  0.031 216  0.038 313  0.030  16
DCP 3    .030    -0.126    2.236 346  0.120  20  0.075 128  0.003 199  0.046 282  0.012   3  0.010 140  0.016 296  0.022 352
DCP 4    .049     0.175    1.831 347  0.082   0  0.063 117  0.074 178  0.045 258  0.030 321  0.020  45  0.011  91  0.003 317
DCP 5    .074     0.321    1.469 347  0.056 342  0.014  86  0.039 154  0.023 245  0.018 300  0.012   2  0.009  70  0.005 132
DCP 6    .099     0.391    1.223 348  0.041 329  0.019 327  0.026 147  0.004 208  0.007 279  0.003 344  0.008  60  0.002 106
DCP 7    .149     0.273    0.896 349  0.027 334  0.008 322  0.014 135  0.001 102  0.004 277  0.001 315  0.004 316  0.004  97
DCP 8    .200     0.214    0.731 355  0.019 353  0.011 315  0.015 146  0.003 321  0.002 278  0.002 279  0.006  54  0.003 130
DCP 9    .250     0.199    0.631 352  0.017  14  0.009 307  0.019 332  0.001 276  0.003 255  0.005 186  0.003 297  0.003  92
DCP10    .300     0.190    0.530 3[illegible]  0.018 359  0.004 340  0.018 316  0.003 119  0.005 281  0.004 116  0.007 241  0.007  87
DCP11    .399     0.171    0.426   2  0.013  33  0.008 309  0.021 339  0.002 137  0.000 195  0.003 208  0.002 160  0.002 100
DCP12    .501     0.125    0.317   6  0.008  69  0.005 338  0.019 346  0.001 275  0.002 143  0.003 130  0.003 124  0.002 114
DCP13    .600     0.146    0.241  11  0.010  80  0.003 261  0.019 338  0.003 329  0.003 224  0.003  50  0.005  58  0.001 175
DCP14    .701     0.210    0.169  14  0.012  95  0.002 249  0.018 339  0.003 311  0.001   0  0.003 316  0.004 106  0.003  34
DCP15    .800     0.100    0.098  26  0.011 153  0.008 233  0.025 334  0.002  10  0.006  44  0.004 134  0.004 166  0.003 251
DCP16    .900    -0.091    0.034  75  0.016 185  0.009 227  0.017 329  0.007 277  0.003 303  0.001 326  0.004 298  0.002  41
DCP17    .969    -0.045    0.029 162  0.008 191  0.007 195  0.016   4  0.005 204  0.001 122  0.004 297  0.000 320  0.003 223
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                TUNED HZ  DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                  0.0      45.27      0.136      0.506      5.49       0.0         2.48     12039.2      20

                V         Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                 169.4     74990.     0.00E 07  -0.034      0.871       7.95     -0.00072    0.987       0.0
                (555.9)   (1566.2)
                                                      HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             2.480    5.494   0  0.265   6  0.088 294  0.052 140  0.017  48  0.025  58  0.012 240  0.026 143  0.003 290
CN                0.387    0.485 353  0.022   0  0.005 325  0.008 131  0.000 296  0.002 146  0.002 318  0.002 339  0.001   4
CM               -0.008    0.023 301  0.003 251  0.001 132  0.004 320  0.000 249  0.001 248  0.001 147  0.001 155  0.000 201

DCP 1    .010     1.118    3.370 341  0.136 291  0.106 115  0.021 358  0.010 237  0.015 337  0.020 250  0.012 150  0.015  17
DCP 2    .020     1.058    2.678 346  0.164 283  0.100 148  0.094  42  0.063 307  0.031 199  0.003 337  0.030 198  0.033  79
DCP 3    .030     1.085    2.212 346  0.093 301  0.026 158  0.068  40  0.482 304  0.088 202  0.075 103  0.055 358  0.043 265
DCP 4    .049     1.176    1.867 346  0.067 315  0.049 316  0.035 226  0.327 118  0.021  27  0.021 269  0.019 193  0.008  69
DCP 5    .074     1.120    1.498 347  0.058 326  0.022 306  0.009 255  0.007 116  0.005 145  0.006 233  0.005 185  0.001 273
DCP 6    .099     1.046    1.236 348  0.054 347  0.023 319  0.010 288  0.004 196  0.003 171  0.004 290  0.010 162  0.001  93
DCP 7    .149     0.755    0.898 349  0.044 357  0.017 323  0.004 291  0.004 123  0.002 142  0.001 279  0.006 139  0.003 153
DCP 8    .200     0.604    0.734 354  0.037  12  0.014 326  0.009 310  0.004 144  0.001   4  0.004 271  0.010 291  0.003  36
DCP 9    .250     0.514    0.625 352  0.034  16  0.011 326  0.013 134  0.002  19  0.003 107  0.001 244  0.002  86  0.003 358
DCP10    .300     0.464    0.570 353  0.033  14  0.009 310  0.009 126  0.002 138  0.001 238  0.001  11  0.005  70  0.003 217
DCP11    .399     0.368    0.416   3  0.026  28  0.006 354  0.017 139  0.002 131  0.002  76  0.002 322  0.005  12  0.002 345
DCP12    .501     0.288    0.313   5  0.025  31  0.003 355  0.012 134  0.002 228  0.001  14  0.004 315  0.005  11  0.003   1
DCP13    .600     0.267    0.241  10  0.021  39  0.001 294  0.010 138  0.003 132  0.001 276  0.002 348  0.006 345  0.001 337
DCP14    .701     0.292    0.161  15  0.015  40  0.004 344  0.013 139  0.001 288  0.004 116  0.005 314  0.003 308  0.001 255
DCP15    .800     0.140    0.092  26  0.010  45  0.001 281  0.016 137  0.001 294  0.004 115  0.004 321  0.006 310  0.004  34
DCP16    .900    -0.085    0.030  45  0.003 284  0.003  21  0.010 130  0.004  39  0.004  28  0.002 337  0.004 222  0.001 191
DCP17    .969    -0.058    0.025 176  0.002 196  0.009 235  0.015 137  0.005 302  0.001 135  0.003 346  0.006  53  0.006  32
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0        45.34      0.136       0.506      5.50       0.0         4.09     12039.3      20

           V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
            169.3      75009.     0.80E 07   -0.029      1.096      10.33     -0.00090    1.235       0.0
           (555.6)    (1566.6)
                                                   HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           4.092   5.502   0   0.261  10   0.113 294   0.048 358   0.033  56   0.019  91   0.010 232   0.018 120   0.004 229
CN              0.620   0.459 359   0.047 344   0.007 201   0.011  11   0.005 194   0.004  84   0.003 333   0.002 272   0.001 127
CM             -0.000   0.031 308   0.004 219   0.003 288   0.005 183   0.002  26   0.001 277   0.001 159   0.001 124   0.000 327

DCP 1   .010    2.523   2.960 343   0.216  11   0.205 300   0.110 184   0.053 352   0.078 192   0.041  70   0.011 205   0.020  34
DCP 2   .020    2.372   2.741 349   0.174 302   0.084 316   0.125 226   0.056 107   0.043 227   0.066 115   0.021 358   0.021 103
DCP 3   .030    2.310   2.478 348   0.214 282   0.022 306   0.108 232   0.103 125   0.027   9   0.049 120   0.061  14   0.022 282
DCP 4   .049    2.097   1.895 352   0.262 341   0.197 274   0.160 192   0.137 102   0.095   4   0.046 238   0.038  66   0.055 288
DCP 5   .074    1.799   1.417 353   0.221 341   0.138 241   0.088 128   0.049  38   0.024  21   0.044 319   0.040 225   0.016 167
DCP 6   .099    1.599   1.168 353   0.140 347   0.067 225   0.067  99   0.063   0   0.040 275   0.025 226   0.028 166   0.021  91
DCP 7   .149    1.168   0.844 354   0.074 344   0.026 177   0.035  41   0.030 297   0.019 206   0.007  76   0.001 187   0.002 217
DCP 8   .200    0.968   0.732 358   0.048 305   0.053 126   0.052  14   0.041 272   0.024 165   0.010  64   0.003 330   0.006 316
DCP 9   .250    0.851   0.634 355   0.035 263   0.063  94   0.071 344   0.053 223   0.039 111   0.024   6   0.011 272   0.008 183
DCP10   .300    0.733   0.507 357   0.024 314   0.036  82   0.044 333   0.031 201   0.024  82   0.017 330   0.012 220   0.011  95
DCP11   .399    0.593   0.390   9   0.033   2   0.015  92   0.024 355   0.015 210   0.013  72   0.009 307   0.002  31   0.002  82
DCP12   .501    0.434   0.289  15   0.040   7   0.004 112   0.013   4   0.005 190   0.006  58   0.005 284   0.002  20   0.004  43
DCP13   .600    0.364   0.207  26   0.045  12   0.008 203   0.013  41   0.008 190   0.006  44   0.004   1   0.002 345   0.001 302
DCP14   .701    0.344   0.134  44   0.051  16   0.012 224   0.014  35   0.003 173   0.003  87   0.002 294   0.003 281   0.001  45
DCP15   .800    0.167   0.086  40   0.031  10   0.006 211   0.015  19   0.005 170   0.005 197   0.002 344   0.005 292   0.006 162
DCP16   .900   -0.073   0.040  62   0.008 301   0.005 100   0.010 344   0.003 155   0.003 2[illegible]   0.003 119   0.004 281   0.002 172
DCP17   .969   -0.066   0.014 137   0.014 264   0.008 108   0.011 318   0.004 153   0.003 354   0.002  24   0.006  12   0.003 247
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0        45.20      0.137       0.505      5.45       0.0         7.47     12039.4      20

           V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
            168.7      74693.     0.80E 07   -0.057      1.257      12.47     -0.00070    0.942       0.0
           (553.6)    (1560.0)
                                                   HARMONIC ANALYSIS
DATA
TYPE    X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           7.470   5.634   0   0.294  26   0.183 314   0.122 119   0.015  43   0.015  85   0.011 240   0.009 194   0.011 274
CN              0.741   0.364  24   0.138   3   0.038 261   0.020 159   0.005  79   0.006 313   0.005 209   0.003 147   0.002  67
CM             -0.002   0.023 255   0.022  82   0.019 332   0.006 263   0.002 215   0.002 156   0.001  67   0.001 230   0.000 155

DCP 1   .010    3.247   1.614 352   0.874  57   0.546 336   0.119 240   0.027   1   0.029 200   0.026 210   0.033  77   0.058 336
DCP 2   .020    2.913   1.539   1   0.713  62   0.585 351   0.222 260   0.062  31   0.107 282   0.039 231   0.043 183   0.066  16
DCP 3   .030    2.728   1.340   1   0.619  59   0.539 354   0.276 273   0.018 297   0.159 261   0.086 170   0.035 257   0.021 176
DCP 4   .049    2.375   0.927  20   0.756  41   0.348 331   0.095 304   0.081 288   0.084 269   0.089 223   0.059 183   0.031 188
DCP 5   .074    2.105   0.795  22   0.607  33   0.289 316   0.067 252   0.053 279   0.077 235   0.057 188   0.050 178   0.043 149
DCP 6   .099    1.864   0.678  23   0.474  26   0.232 297   0.091 202   0.027 183   0.050 178   0.054 122   0.032  94   0.033  67
DCP 7   .145    1.426   0.653  23   0.355   1   0.194 260   0.105 161   0.027 110   0.032 129   0.041  69   0.024  24   0.021 344
DCP 8   .200    1.184   0.606  27   0.292 356   0.161 255   0.082 168   0.037 136   0.043 101   0.033  34   0.020 322   0.019   5
DCP 9   .250    0.995   0.549  16   0.183 337   0.085 220   0.046 137   0.025 136   0.036  60   0.028 339   0.021 277   0.016 220
DCP10   .300    0.868   0.477  17   0.153 329   0.073 203   0.036 117   0.018 133   0.026  45   0.016 309   0.008 249   0.005 175
DCP11   .399    0.710   0.402  28   0.136 332   0.070 204   0.040 129   0.016 111   0.026  31   0.023 289   0.011 185   0.005 131
DCP12   .501    0.525   0.313  33   0.106 327   0.060 185   0.037 106   0.016  48   0.020 336   0.015 230   0.011 131   0.004  47
DCP13   .600    0.429   0.241  42   0.080 324   0.053 167   0.021  95   0.010  40   0.017 331   0.012 226   0.007 106   0.006 103
DCP14   .701    0.302   0.173  58   0.063 324   0.051 153   0.019  60   0.010 350   0.012 297   0.007 184   0.004  88   0.004  68
DCP15   .800    0.206   0.123  53   0.050 294   0.044 146   0.013  72   0.007  25   0.013 289   0.003 181   0.004  74   0.003 350
DCP16   .900   -0.043   0.077  31   0.052 260   0.033 130   0.008 105   0.009   5   0.011 262   0.010 138   0.009   5   0.003 215
DCP17   .969   -0.058   0.018  28   0.030 257   0.016 133   0.009 156   0.008   1   0.006 235   0.001  68   0.002  33   0.005 308
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                        FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

              TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        45.35      0.138      0.501      5.33        0.0         9.94      12039.5      20

              V          Q          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               167.0      73142.     0.79E 07  -0.134      1.494       14.14      -0.00107     1.449       0.0
              (549.0)    (1527.6)
                                                    .    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             9.936    5.330   0   0.313  30   0.144 352   0.194 209   0.011 169   0.036  77   0.012 220   0.009 138   0.021 238
CN                0.876    0.354  53   0.149  15   0.060 341   0.036 249   0.015 176   0.010 109   0.007  73   0.006  12   0.003 258
CM               -0.015    0.049 223   0.038 101   0.012  53   0.017  16   0.009 305   0.004 274   0.002 234   0.002 168   0.001  86

DCP 1    .010     3.725    0.303  33   1.101  71   0.206   0   0.115  85   0.013 355   0.024  74   0.034 344   0.063 266   0.060 218
DCP 2    .020     3.298    0.473  41   1.076  81   0.307  14   0.214  97   0.093 352   0.092 109   0.024  30   0.024 318   0.034 238
DCP 3    .030     3.066    0.438  41   0.888  84   0.373  33   0.186  74   0.141   7   0.129  91   0.094   9   0.030 116   0.004 267
DCP 4    .049     2.734    0.602  76   0.714  63   0.185  57   0.120  64   0.105  57   0.084  47   0.076  44   0.050  42   0.044  38
DCP 5    .074     2.387    0.504  74   0.577  55   0.156  46   0.123  31   0.066  17   0.079  33   0.067  24   0.066  31   0.059  16
DCP 6    .099     2.081    0.519  71   0.449  45   0.112  19   0.119 344   0.079 296   0.036 317   0.040 299   0.034 330   0.054 293
DCP 7    .149     1.621    0.567  57   0.356  23   0.118 354   0.169 312   0.096 261   0.055 259   0.045 225   0.019 250   0.050 226
DCP 8    .200     1.338    0.545  57   0.294  22   0.108 359   0.141 309   0.078 262   0.046 260   0.042 231   0.033 223   0.031 195
DCP 9    .250     1.184    0.519  49   0.239   2   0.082 332   0.105 276   0.066 216   0.035 206   0.037 165   0.024 147   0.024 126
DCP10    .300     1.037    0.476  47   0.207 356   0.082 323   0.101 259   0.057 190   0.021 176   0.026 142   0.013 114   0.013 121
DCP11    .399     0.857    0.439  53   0.172 353   0.059 326   0.086 259   0.049 194   0.023 178   0.027 142   0.017 113   0.015  88
DCP12    .501     0.654    0.374  51   0.134 338   0.042 307   0.082 238   0.047 165   0.029 163   0.031 102   0.023  46   0.013   6
DCP13    .600     0.535    0.332  55   0.128 322   0.028 265   0.069 219   0.048 138   0.025 106   0.026  67   0.021   6   0.010 307
DCP14    .701     0.462    0.269  58   0.121 302   0.031 216   0.062 193   0.038 104   0.023  92   0.024  33   0.015 329   0.010 285
DCP15    .800     0.278    0.224  44   0.119 267   0.036 226   0.070 176   0.035  87   0.023  69   0.018 350   0.012 338   0.008 255
DCP16    .900     0.012    0.160  24   0.084 281   0.043 235   0.057 156   0.024  87   0.023  44   0.013 316   0.011 286   0.017 187
DCP17    .969    -0.046    0.065  24   0.044 288   0.021 251   0.032 163   0.013 103   0.009  57   0.004  56   0.007 331   0.006 258

                        FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

              TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        45.65      0.136      0.508      5.23        0.0        12.01      12041.1      20

              V          Q          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               170.4      75325.     0.80E 07  -0.153      1.492       13.97      -0.00138     1.905       0.0
              (559.2)    (1573.2)
                                                         HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            12.014    5.227   0   0.170  32   0.188  91   0.123 224   0.045 324   0.006 216   0.008  77   0.017 190   0.016  33
CN                0.954    0.337  72   0.090  55   0.065  42   0.021   0   0.026 308   0.036 268   0.007 251   0.002 248   0.005 357
CM               -0.038    0.070 213   0.021 130   0.023 147   0.007 124   0.011  96   0.004  41   0.007  41   0.001 336   0.000 206

DCP 1    .010     3.937    0.677 161   0.607  81   0.191 138   0.076  87   0.048 162   0.012  72   0.036 158   0.034 187   0.028 144
DCP 2    .020     3.552    0.748 156   0.612  92   0.261 151   0.062 105   0.059 199   0.019  28   0.051 191   0.035 263   0.055 209
DCP 3    .030     3.204    0.628 156   0.752  99   0.323 148   0.104 206   0.022 356   0.047  48   0.049 199   0.050 211   0.036 247
DCP 4    .049     2.780    0.801 123   0.359 104   0.257 147   0.103 150   0.073 211   0.075 275   0.048 302   0.029 344   0.020   1
DCP 5    .074     2.446    0.710 116   0.324  88   0.245 125   0.069 145   0.061 177   0.058 258   0.049 265   0.065 312   0.042 345
DCP 6    .099     2.144    0.991 108   0.270  72   0.208 100   0.063  64   0.055 107   0.021 130   0.030 168   0.028 213   0.013 256
DCP 7    .149     1.692    0.946  84   0.216  65   0.214  76   0.070  34   0.069  65   0.027  64   0.028  77   0.007 223   0.007 177
DCP 8    .200     1.409    0.492  80   0.184  66   0.171  68   0.062  30   0.061  30   0.008  44   0.009  89   0.031 148   0.013  92
DCP 9    .250     1.288    0.486  70   0.142  58   0.172  49   0.073  16   0.060   6   0.034  16   0.035   3   0.028  21   0.020  15
DCP10    .300     1.127    0.453  64   0.112  50   0.144  38   0.055 358   0.047 346   0.021 358   0.017 330   0.016  39   0.026  13
DCP11    .399     0.949    0.430  63   0.090  47   0.122  25   0.035  14   0.069 343   0.025 309   0.022 298   0.011  29   0.013   0
DCP12    .501     0.744    0.391  58   0.059  17   0.098  10   0.042 335   0.066 311   0.026 268   0.016 259   0.011 296   0.005 343
DCP13    .600     0.622    0.363  56   0.058 347   0.090 352   0.025 326   0.064 295   0.022 244   0.021 250   0.013 252   0.003 219
DCP14    .701     0.527    0.305  53   0.063 314   0.077 331   0.028 282   0.056 262   0.014 198   0.015 240   0.010 179   0.004 337
DCP15    .800     0.349    0.288  40   0.080 317   0.078 312   0.027 275   0.045 252   0.022 205   0.012 157   0.010 192   0.003 191
DCP16    .900     0.065    0.207  26   0.064 333   0.054  03   0.020 300   0.034 229   0.013 195   0.013 156   0.007 122   0.001  62
DCP17    .969    -0.017    0.087  28   0.036 353   0.032 320   0.008 327   0.019 248   0.007 209   0.006 194   0.007  97   0.004  66
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                        FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

          TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT   CYCLES ANALYSED
           0.0           45.65         0.137         0.504         5.23          0.0           14.79        12041.2       20

          V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
           169.1         74593.        0.80E 07     -0.154         1.490         14.93        -0.00171       2.350         0.0
          (554.8)       (1557.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              14.790     5.226   0   0.164   2   0.001 176   0.069 126   0.046  42   0.028  87   0.011 239   0.029 106   0.003 266
CN                  0.983     0.345  88   0.073 113   0.039 103   0.018 107   0.021 100   0.011  99   0.006  52   0.001 147   0.008  33
CM                 -0.041     0.007 210   0.019 222   0.015 192   0.010 221   0.006 230   0.004 208   0.001 201   0.001 239   0.001 191

DCP 1    .010       3.832     1.403 160   0.083 120   0.213 174   0.064 199   0.021 350   0.017 311   0.032 207   0.019 236   0.027  80
DCP 2    .020       3.631     1.390 171   0.113 195   0.250 179   0.074 236   0.020  49   0.024 334   0.031  65   0.012  65   0.037  99
DCP 3    .030       3.301     1.448 173   0.088 171   0.182 195   0.121 262   0.020 350   0.020 312   0.059  66   0.015 144   0.026  87
DCP 4    .049       2.784     1.262 156   0.292 235   0.071 175   0.041 301   0.029   9   0.077  37   0.030 101   0.045  88   0.019 132
DCP 5    .074       2.307     0.984 139   0.270 184   0.193 199   0.100 294   0.051  72   0.040 112   0.018 175   0.023 250   0.028  25
DCP 6    .099       2.069     0.798 128   0.196 158   0.203 156   0.119 228   0.023 259   0.021 337   0.034  65   0.015 195   0.007 154
DCP 7    .149       1.686     0.632 105   0.177 135   0.160 127   0.110 166   0.040 200   0.012 231   0.025 315   0.019 344   0.014  47
DCP 8    .200       1.475     0.552  98   0.109 136   0.142 135   0.098 166   0.065 191   0.015 234   0.015 286   0.009 252   0.012  58
DCP 9    .250       1.324     0.532  84   0.180 119   0.122 107   0.087 120   0.076 155   0.037 164   0.010 174   0.016 273   0.011  30
DCP10    .300       1.175     0.476  76   0.159 110   0.085  92   0.064 121   0.060 130   0.035 146   0.010  96   0.012 167   0.014 318
DCP11    .399       0.994     0.429  70   0.121 111   0.064  74   0.050  98   0.055 122   0.026 103   0.013  86   0.003  31   0.017  16
DCP12    .501       0.797     0.390  60   0.090  97   0.043  41   0.042  78   0.035  97   0.024  63   0.006  62   0.004 100   0.010 351
DCP13    .600       0.663     0.384  55   0.066  77   0.043  25   0.039  46   0.034  79   0.023  45   0.010  97   0.005 147   0.009  64
DCP14    .701       0.562     0.349  50   0.053  42   0.047 359   0.039  31   0.024  53   0.023  15   0.009  35   0.005  75   0.009  32
DCP15    .800       0.392     0.326  39   0.066  28   0.052   8   0.036  17   0.023  23   0.016   0   0.009  34   0.003 298   0.009  73
DCP16    .900       0.110     0.218  33   0.075  27   0.044  19   0.030  16   0.024  12   0.019  14   0.012 329   0.003 118   0.006 320
DCP17    .969       0.002     0.096  39   0.044  35   0.023  28   0.018  29   0.015  45   0.013 343   0.004 332   0.009   6   0.004 351

                        FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

          TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT   CYCLES ANALYSED
           0.0           45.64         0.138         0.503         5.27          0.0           17.27        12041.3       20

          V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TDR           EXT DAMP
           168.4         74095.        0.79E 07     -0.155         1.377         15.76        -0.00210       2.874         0.0
          (552.5)       (1547.5)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              17.266     5.267   0   0.195 357   0.088 270   0.060 '08   0.034  38   0.013  93   0.022 237   0.019 167   0.005 332
CN                  0.994     0.325  87   0.048 145   0.026 154   0.010  '4   0.003 267   0.002 116   0.008 332   0.001 145   0.003 310
CM                 -0.061     0.083 220   0.023 241   0.009 295   0.004 3 8   0.001  22   0.001 348   0.003 133   0.001 285   0.001 103

DCP 1    .010       3.131     1.247 163   0.077 238   0.040   6   0.040  73   0.017 310   0.038  75   0.009 233   0.034 212   0.005 180
DCP 2    .020       3.045     1.183 166   0.206 237   0.102  18   0.066  99   0.022  69   0.012 109   0.014 261   0.018 288   0.007  28
DCP 3    .030       2.911     1.258 169   0.348 272   0.074 356   0.075  70   0.061 130   0.020 103   0.051 177   0.035 311   0.012   4
DCP 4    .049       2.470     0.845 151   0.363 251   0.094 356   0.057  44   0.039 107   0.022 190   0.020 309   0.003 133   0.015  58
DCP 5    .074       2.185     0.638 135   0.263 224   0.034 267   0.014 348   0.026   8   0.025 130   0.015 262   0.011 313   0.009 319
DCP 6    .099       1.998     0.553 120   0.207 209   0.026 243   0.024 287   0.031   6   0.025  92   0.017 136   0.008 350   0.009  23
DCP 7    .149       1.701     0.487 101   0.183 182   0.051 199   0.014 282   0.022 252   0.012 324   0.005 351   0.008  43   0.012  58
DCP 8    .200       1.470     0.432 107   0.161 178   0.062 239   0.035 313   0.026 358   0.022  22   0.010 171   0.015 295   0.012 266
DCP 9    .250       1.370     0.445  96   0.149 156   0.055 190   0.018 189   0.010 357   0.011  39   0.016  71   0.012 184   0.014 157
DCP10    .300       1.227     0.418  87   0.129 140   0.077 177   0.022 201   0.020 282   0.014   0   0.008   9   0.005 248   0.004 216
DCP11    .399       1.066     0.415  79   0.111 133   0.067 179   0.019 234   0.018 268   0.010 295   0.019  24   0.010 189   0.004 250
DCP12    .501       0.861     0.400  65   0.099 106   0.065 153   0.029 187   0.020 206   0.017 258   0.034 357   0.008 122   0.014  73
DCP13    .600       0.714     0.384  58   0.085  81   0.048 127   0.023 163   0.014 181   0.012 183   0.022 327   0.010 151   0.018 306
DCP14    .701       0.598     0.360  48   0.076  52   0.029  91   0.022 125   0.007 109   0.015 159   0.017 307   0.007  65   0.013 314
DCP15    .800       0.453     0.330  46   0.084  44   0.036  87   0.026  97   0.008  27   0.011 113   0.013 270   0.009  39   0.005 248
DCP16    .900       0.170     0.227  48   0.056  37   0.031  66   0.012 104   0.004 205   0.006 111   0.007 233   0.004 127   0.005 265
DCP17    .969       0.027     0.097  58   0.027  41   0.018 100   0.015 122   0.001  28   0.003  84   0.013 266   0.002  99   0.006 212
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                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
              0.0          45.67       0.138        0.503        5.26         0.0          19.82      12041.4       20

            V            Q            RN          CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                                       0.79E 07   -0.160        1.299        20.30       -0.00224      3.004         0.0
             168.2        74066.
            (551.9)      (1546.9)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             19.823   5.264   0   0.227   3   0.031 260   0.023 274   0.032  32   0.008  67   0.024 221   0.008 140   0.005 326
CN                 0.990   0.285  75   0.030 127   0.012 151   0.010 288   0.003 129   0.007 314   0.003 111   0.004 315   0.003  65
CM                -0.085   0.072 234   0.013 230   0.005 289   0.004  86   0.001 301   0.002 101   0.001 271   0.002 130   0.001 245

DCP 1     .010     2.344   0.584 155   0.019 186   0.051  55   0.040  82   0.042  36   0.025  20   0.022 337   0.013 339   0.020 267
DCP 2     .020     2.387   0.500 150   0.034 164   0.027 221   0.065 109   0.024  60   0.020 133   0.022  38   0.007 109   0.015  49
DCP 3     .030     2.349   0.720 160   0.217 267   0.050 109   0.019 354   0.058 102   0.038 168   0.015 194   0.014 214   0.011 255
DCP 4     .049     2.204   0.269 119   0.121 231   0.052 347   0.023  91   0.036 217   0.006  27   0.012 341   0.009 153   0.018 138
DCP 5     .074     2.061   0.280 107   0.114 216   0.048 317   0.007  29   0.016 220   0.027 339   0.012  88   0.016 187   0.004 333
DCP 6     .099     1.971   0.286  85   0.132 205   0.045 296   0.011 326   0.012 137   0.009  75   0.012  80   0.005 193   0.016 348
DCP 7     .149     1.675   0.278  87   0.119 165   0.095 265   0.026 359   0.030 345   0.026 338   0.010 129   0.007 344   0.022 110
DCP 8     .200     1.423   0.289  88   0.065 171   0.032 219   0.026 335   0.002 242   0.016  33   0.019  92   0.009 179   0.002 123
DCP 9     .250     1.361   0.325  84   0.060 147   0.039 191   0.015 260   0.008 278   0.011 344   0.013 120   0.013 214   0.011   9
DCP10     .300     1.240   0.328  77   0.062 136   0.035 181   0.009 276   0.011 231   0.013 317   0.017 211   0.005 344   0.004 244
DCP11     .399     1.118   0.381  74   0.059 121   0.037 157   0.022 262   0.006 139   0.010 288   0.008 330   0.012  53   0.005  51
DCP12     .501     0.936   0.380  66   0.063 103   0.034 130   0.017 265   0.007 104   0.006 168   0.013 268   0.021 356   0.006  34
DCP13     .600     0.795   0.364  62   0.054  86   0.023 112   0.012 280   0.007 163   0.013 306   0.006 148   0.012 325   0.004  85
DCP14     .701     0.682   0.329  56   0.055  50   0.023  97   0.009 264   0.002  81   0.008 299   0.006 143   0.013 293   0.004 178
DCP15     .800     0.524   0.298  54   0.046  46   0.018  81   0.007 298   0.005 118   0.011 261   0.007  90   0.007 271   0.004 105
DCP16     .900     0.219   0.217  56   0.041  29   0.012  84   0.013 270   0.010  95   0.008 298   0.010  51   0.008 208   0.006  44
DCP17     .969     0.047   0.104  68   0.012  61   0.009 109   0.015 262   0.003 169   0.005 304   0.008  70   0.001 108   0.006  15

                      FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
              0.0          68.71       0.200        0.524        5.96         0.0          0.77       12047.1       20

            V            Q            RN          CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                                       0.82E 07   -0.046        0.567         7.11       -0.00065      0.945         0.0
             175.2        79505.
            (574.7)      (1660.5)                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.771   5.962   0   0.516 343   0.134 218   0.069 154   0.009  42   0.023  64   0.002  58   0.012 117   0.007 116
CN                 0.127   0.441 359   0.028  15   0.035 256   0.035 195   0.003 298   0.001 148   0.001 276   0.001 251   0.001  59
CM                -0.011   0.031 241   0.006 281   0.001 133   0.001  60   0.000 206   0.001   6   0.000 105   0.001  41   0.000  17

DCP 1     .010    -0.664   2.852 339   0.169 281   0.221 266   0.181 334   0.133  21   0.046  50   0.024   6   0.040  37   0.028  84
DCP 2     .020    -0.190   2.250 346   0.127 326   0.047 232   0.022 266   0.328 336   0.041  90   0.036 188   0.030 268   0.020 343
DCP 3     .030     0.042   2.027 346   0.145 345   0.072 155   0.071 177   0.351 256   0.017  24   0.010 168   0.015 257   0.014 320
DCP 4     .049     0.271   1.733 347   0.126 356   0.069 113   0.089 158   0.056 232   0.017 318   0.005 327   0.003 351   0.007 287
DCP 5     .074     0.982   1.362 347   0.103 343   0.017  80   0.057 127   0.338 209   0.013 264   0.015 299   0.016  14   0.007 101
DCP 6     .099     0.611   1.136 348   0.098 360   0.009 178   0.024 141   0.322 195   0.006 324   0.011 324   0.008   2   0.014 125
DCP 7     .149     0.296   0.621 351   0.055 346   0.011 259   0.010 110   0.009 220   0.006  61   0.005 233   0.000 195   0.002 281
DCP 8     .200     0.235   0.671 356   0.009   6   0.015 246   0.002 214   0.012 321   0.007 112   0.007 156   0.003 116   0.006  68
DCP 9     .250     0.172   0.967 356   0.048 358   0.012 242   0.029 178   0.005 166   0.025 143   0.002 250   0.009  67   0.005 352
DCP10     .300     0.157   0.466 357   0.019 119   0.008 259   0.007 207   0.001 156   0.002 121   0.001 355   0.005 131   0.005 322
DCP11     .399     0.167   0.386  42   0.036  31   0.007 223   0.007 236   0.001 296   0.005 203   0.002 298   0.004 213   0.003  16
DCP12     .501     0.106   0.336  18   0.033  45   0.006 269   0.006 222   0.015   6   0.009 235   0.009  67   0.001 269   0.003  49
DCP13     .600     0.119   0.235  25   0.026  59   0.006 305   0.005 226   0.005  45   0.004 183   0.002  75   0.003 204   0.004 131
DCP14     .701     0.195   0.168  32   0.024  67   0.003 277   0.004 219   0.006 295   0.002  34   0.001 154   0.003 257   0.003 183
DCP15     .800     0.083   0.125  48   0.023  84   0.004 320   0.002 234   0.003 316   0.003 155   0.003 344   0.004 239   0.003 185
DCP16     .900    -0.084   0.049  79   0.018 120   0.003 230   0.003 242   0.006 207   0.006 195   0.004 229   0.003 232   0.002 284
DCP17     .969    -0.045   0.030 171   0.012 162   0.001 107   0.003 242   0.002 116   0.002 143   0.002 269   0.001  37   0.001 227
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                    TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                      0.0        66.50       0.202        0.518       5.95        0.0           2.50      12047.2       20

                    V           Q           RN           CM(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP   TDR         EXT DAMP
                    172.9       78141.       0.81E 07    -0.042       0.807        8.76       -0.00066     0.945       0.0
                   (567.4)     (1632.0)
                                                               HARMONIC ANALYSES
DATA
TYPE        X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 2.501    5.951   0    0.489 360    0.093 197    0.014 186    0.020 153    0.026  73    0.012 210    0.008 130    0.005  45
CN                    0.360    0.444 358    0.093 355    0.004 281    0.001  58    0.004 248    0.001 105    0.002 210    0.001   3    0.000 168
CM                   -0.009    0.082 294    0.006 251    0.001 116    0.000 206    0.001 132    0.000  86    0.000  55    0.000 246    0.003 272

DCP 1       .010      0.956    3.198 337    0.215 289    0.116 105    0.042  30    0.026 175    0.015  82    0.011 178    0.005 119    0.006 359
DCP 2       .020      0.913    2.476 345    0.204 292    0.090 149    0.079  52    0.052 242    0.034 103    0.016 112    0.006 334    0.008  94
DCP 3       .030      0.921    1.977 345    0.112 334    0.044 312    0.016 200    0.013 209    0.013 179    0.021 102    0.021 351    0.013 244
DCP 4       .049      1.101    1.755 346    0.121 330    0.015 261    0.013 173    0.017 168    0.013  46    0.004 241    0.002 183    0.004  84
DCP 5       .074      1.035    1.401 346    0.096 316    0.014 252    0.007 199    0.012 157    0.008  77    0.002 208    0.007  52    0.002 311
DCP 6       .099      0.970    1.199 348    0.082 329    0.013 263    0.006 203    0.010 160    0.005  46    0.003 166    0.001 243    0.001 288
DCP 7       .149      0.701    0.836 350    0.062 337    0.008 285    0.006 185    0.008 179    0.002 128    0.003 198    0.002  11    0.000 110
DCP 8       .200      0.558    0.681 358    0.051   0    0.009 312    0.002 308    0.007 222    0.003 144    0.002 132    0.003 271    0.002 130
DCP 9       .250      0.498    0.561 356    0.052 354    0.009 305    0.002 226    0.006 217    0.003 207    0.005 251    0.004 353    0.001 300
DCP10       .300      0.437    0.483 358    0.045   1    0.008 286    0.002 321    0.008 214    0.004 179    0.003 337    0.004 318    0.002 203
DCP11       .399      0.368    0.391  12    0.041  20    0.006 313    0.002 157    0.003 272    0.001 260    0.001 215    0.001 309    0.001 199
DCP12       .501      0.276    0.299  18    0.038  24    0.006 294    0.002   5    0.004 303    0.004 262    0.003 260    0.002 328    0.004 233
DCP13       .600      0.245    0.231  25    0.029  46    0.006 307    0.004 358    0.005 294    0.004 280    0.004 255    0.002 181    0.001  71
DCP14       .701      0.206    0.163  33    0.026  43    0.000 284    0.003  80    0.007 309    0.001 209    0.001 220    0.002 100    0.002  81
DCP15       .800      0.125    0.100  47    0.020  53    0.005 224    0.002   9    0.005 310    0.001  75    0.003 176    0.003  68    0.001 276
DCP16       .933     -0.062    0.341  76    0.010  62    0.002 187    0.004 101    0.002 294    0.002 140    0.003 206    0.002  62    0.002  60
DCP17       .969     -0.057    0.026 172    0.004 178    0.004   2    0.005   2    0.004 317    0.002 299    0.001 199    0.003 335    0.002  88

                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                    TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT  CYCLES ANALYSED
                      0.0        66.66       0.201        0.522       5.51        0.0           5.01      12051.1       20

                    V           Q           RN           CM(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP   TDR         EXT DAMP
                    174.6       79314.       0.82E 07    -0.036       1.050       11.21       -0.00079     1.131       0.0
                   (572.7)     (1656.5)
                                                               HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 5.016    5.915   0    0.485 347    0.141 190    0.020 204    0.018 156    0.026  75    0.027 237    0.004  63    0.007 199
CN                    0.961    0.425   3    0.050 345    0.012 229    0.002  18    0.002 198    0.001 266    0.001 177    0.002  17    0.001 210
CM                    0.033    0.040 330    0.007 219    0.001 236    0.002 153    0.000  21    0.001 125    0.000  59    0.000 324    0.000 287

DCP 1       .010      4.476    4.803 336    0.109 349    0.118 302    0.091 189    0.016 110    0.032 133    0.016  42    0.011 315    0.006 306
DCP 2       .020      2.261    2.598 346    0.179 276    0.039 330    0.095 225    0.061 128    0.003 227    0.032 115    0.021   1    0.009 133
DCP 3       .030      2.130    2.335 345    0.219 270    0.021 206    0.072 299    0.076 117    0.030  17    0.014 107    0.029   4    0.014 275
DCP 4       .049      2.194    1.867 349    0.236 318    0.138 245    0.096 170    0.062  94    0.044   1    0.020 242    0.016  70    0.018 331
DCP 5       .074      1.756    1.393 352    0.229 323    0.139 225    0.073 116    0.021  39    0.021  35    0.026 313    0.017 244    0.008 180
DCP 6       .099      1.565    1.118 357    0.130 325    0.069 191    0.068  65    0.061 319    0.065 225    0.022 118    0.009 352    0.008 172
DCP 7       .149      1.127    0.812 354    0.056 322    0.029 131    0.063 359    0.039 256    0.027 160    0.016  50    0.011 301    0.013 161
DCP 8       .200      0.891    0.638   2    0.061   6    0.000 171    0.010 117    0.011 236    0.003 224    0.006 203    0.009 106    0.007  27
DCP 9       .250      0.788    0.566   0    0.060 345    0.006 282    0.013 280    0.013 166    0.005 315    0.004 236    0.004  61    0.004 256
DCP10       .300      0.672    0.469   3    0.036 351    0.076 275    0.009 330    0.009 165    0.002 241    0.005 190    0.005  58    0.003 172
DCP11       .399      0.550    0.363  16    0.055  13    0.010 258    0.007 335    0.006 249    0.002   2    0.006 210    0.006 161    0.006 257
DCP12       .501      0.415    0.281  27    0.050  16    0.064 281    0.001   1    0.003  16    0.001  95    0.036 189    0.031 130    0.002 196
DCP13       .600      0.391    0.227  37    0.066  19    0.007 223    0.007  12    0.006 241    0.031 129    0.002 218    0.003 282    0.004 203
DCP14       .701      0.336    0.162  54    0.066  15    0.006 223    0.006  16    0.003 265    0.032 347    0.001 156    0.004  40    0.004  22
DCP15       .800      0.160    0.111  69    0.032   0    0.071 166    0.006 316    0.031 156    0.032 296    0.096 250    0.001  69    0.002 165
DCP16       .900     -0.009    0.056  76    0.008 166    0.036  62    0.006 201    0.007 137    0.037 310    0.002 336    0.001 309    0.003  13
DCP17       .969     -0.005    0.023 156    0.042 201    0.005  76    0.006 207    0.006  45    0.003 237    0.002 125    0.002 238    0.004 100
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0          68.79       0.201       0.523       5.85        0.0          7.51      12051.2      20

               V            Q            RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
                174.2        79299.       0.82E 07   -0.073       1.283       13.66      -0.00049     0.710       0.0
               (571.6)      (1656.2)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.509   5.052    0   0.725 358    0.212 140    0.046 156    0.007 238    0.006  78    0.020 200    0.012 191    0.010  45
CN                  0.708   0.475   24   0.116 315    0.037 168    0.016  18    0.015 279    0.012 193    0.002 164    0.003  90    0.004  33
CM                 -0.009   0.032  242   0.030  41    0.019 275    0.037 193    0.005 130    0.003  28    0.001 288    0.002 243    0.002 155

DCP 1    .010       2.719   1.661  354   0.803  34    0.437 298    0.139 149    0.073 307    0.107 174    0.078  48    0.069 284    0.036 196
DCP 2    .020       2.444   1.552   10   0.705  27    0.344 310    0.124 252    0.056 287    0.123 227    0.080 124    0.050 323    0.030 185
DCP 3    .030       2.328   1.367   10   0.615  22    0.293 305    0.141 269    0.110 238    0.108 203    0.084 157    0.031 114    0.019 130
DCP 4    .049       2.199   1.170   17   0.632  16    0.246 292    0.069 295    0.133 259    0.123 189    0.053 146    0.049 143    0.068  80
DCP 5    .074       1.967   1.064   20   0.530   6    0.200 276    0.065 287    0.132 238    0.112 164    0.041 126    0.046 129    0.063  74
DCP 6    .099       1.756   0.930   20   0.407 352    0.170 239    0.019 158    0.068 207    0.086 120    0.046  39    0.026  17    0.041 349
DCP 7    .149       1.368   0.864   17   0.323 323    0.173 205    0.038 122    0.052 156    0.064  68    0.042 345    0.029 323    0.038 280
DCP 8    .200       1.111   0.764   24   0.272 322    0.153 204    0.035 122    0.044 137    0.058  52    0.048 332    0.025 296    0.030 241
DCP 9    .250       1.004   0.709   17   0.236 293    0.148 166    0.047  70    0.040  54    0.051 329    0.040 248    0.022 210    0.028 139
DCP10    .300       0.867   0.618   17   0.199 283    0.114 152    0.026  51    0.033  63    0.040 320    0.034 245    0.019 188    0.025 121
DCP11    .399       0.707   0.520   30   0.164 285    0.107 153    0.045  54    0.031  16    0.043 292    0.028 224    0.015 135    0.012  97
DCP12    .501       0.525   0.416   33   0.118 269    0.088 124    0.044  17    0.031 328    0.036 239    0.023 161    0.019  79    0.015   2
DCP13    .600       0.428   0.342   39   0.101 260    0.080 108    0.040  12    0.035 302    0.032 205    0.011 122    0.011 107    0.017  10
DCP14    .701       0.380   0.254   51   0.070 244    0.059  77    0.019 320    0.027 300    0.027 185    0.013  74    0.009  23    0.011 288
DCP15    .800       0.203   0.181   46   0.078 221    0.057  73    0.021 336    0.028 287    0.021 153    0.009  48    0.009  34    0.008 333
DCP16    .900      -0.033   0.101   25   0.066 209    0.033  60    0.017   9    0.030 261    0.015 142    0.006  34    0.001 350    0.001  65
DCP17    .965      -0.056   0.031   11   0.039 217    0.022  74    0.013  12    0.013 247    0.011 128    0.005  51    0.008  20    0.005 303

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                 0.0          68.80       0.203       0.517       5.73        0.0         10.01      12051.3      20

               V            Q            RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TOR         EXT DAMP
                172.3        77939.       0.81E 07   -0.161       1.494       15.74      -0.00053     0.761       0.0
               (565.5)      (1627.8)                                    HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              10.012   5.727    0   0.768  11    0.235 167    0.069 172    0.012 341    0.042   5    0.025 201    0.014 192    0.007  57
CN                  0.833   0.499   41   0.136 337    0.034 252    0.032 149    0.023  30    0.014 324    0.002 337    0.004 270    0.001 200
CM                 -0.020   0.061  213   0.045  69    0.017   2    0.017 306    0.009 210    0.004 152    0.002 105    0.003  36    0.002 282

DCP 1    .010       3.283   0.783   16   0.982  49    0.208 339    0.209  72    0.139 322    0.043 221    0.016 194    0.008 220    0.032 145
DCP 2    .020       2.942   0.963   37   0.967  54    0.273 340    0.140 102    0.115   6    0.052  67    0.082 340    0.029 218    0.019 184
DCP 3    .030       2.627   0.728   47   0.810  57    0.422  14    0.134   8    0.124  13    0.067 334    0.056 332    0.011 321    0.012   2
DCP 4    .049       2.474   0.762   56   0.697  46    0.142  31    0.179  32    0.105 337    0.051 350    0.062 338    0.037 300    0.005 297
DCP 5    .074       2.168   0.776   56   0.594  36    0.133  13    0.165  10    0.104 317    0.068 335    0.070 309    0.030 288    0.026 327
DCP 6    .099       1.953   0.736   52   0.441  20    0.074 325    0.100 335    0.073 263    0.034 288    0.057 252    0.038 183    0.006 189
DCP 7    .149       1.550   0.792   42   0.375 336    0.096 294    0.101 281    0.077 222    0.030 223    0.050 186    0.031 130    0.016 144
DCP 8    .200       1.292   0.757   44   0.320 355    0.117 295    0.098 258    0.047 208    0.035 241    0.042 174    0.017 137    0.020 182
DCP 9    .250       1.140   0.702   37   0.263 330    0.083 267    0.103 219    0.061 143    0.018 132    0.040 100    0.037  57    0.034   2
DCP10    .300       1.009   0.663   34   0.241 318    0.086 253    0.101 196    0.047 103    0.015 182    0.045  94    0.041  18    0.026 302
DCP11    .399       0.838   0.596   43   0.196 316    0.079 255    0.105 193    0.056  95    0.010  95    0.034  88    0.035  18    0.032 313
DCP12    .501       0.644   0.523   42   0.173 330    0.073 231    0.100 165    0.064  72    0.021  23    0.030  32    0.040 318    0.028 235
DCP13    .600       0.520   0.443   43   0.155 279    0.064 200    0.094 138    0.071  39    0.032 343    0.020 340    0.038 264    0.031 168
DCP14    .701       0.458   0.363   43   0.154 256    0.061 161    0.071 112    0.052   6    0.025 340    0.018 291    0.027 219    0.020 116
DCP15    .800       0.283   0.283   29   0.146 241    0.051 157    0.072  96    0.044 358    0.028 327    0.023 251    0.021 178    0.016  73
DCP16    .900       0.018   0.183   16   0.103 239    0.061 172    0.063  73    0.034 337    0.025 296    0.017 235    0.024 162    0.018  53
DCP17    .965      -0.044   0.071   19   0.047 260    0.026 197    0.038  87    0.017 355    0.006 280    0.015 273    0.023 180    0.014  86
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                             FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

               TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.M        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0           68.76        0.207        0.506        5.67         0.0          12.53        12051.4       20

               V             Q             RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
               169.1         75585.        0.80E 07     -0.229       1.709        17.45        -0.00091     1.267         0.0
              (554.8)       (1577.8)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              12.530    5.666   0    0.542  19    0.208 219    0.071 220    0.024 126    0.048  43    0.014 252    0.008 286    0.010 180
CN                  0.942    0.929  54    0.122   9    0.057 324    0.044 240    0.033 160    0.014 108    0.007  94    0.004   6    0.002 164
CM                 -0.034    0.046 207    0.039 131    0.031  77    0.014  18    0.012 318    0.034 283    0.003 240    0.002 171    0.001 121

DCP 1     .010      4.562    0.711 127    0.573  61    0.174 121    0.118  34    0.097 208    0.082  99    0.046   6    0.056   5    0.033 311
DCP 2     .020      3.166    0.779 101    0.901  76    0.178  97    0.150  55    0.154 224    0.075 185    0.052 151    0.049  80    0.036  55
DCP 3     .030      2.866    0.699 107    0.746  82    0.259  92    0.212  99    0.094 153    0.113 130    0.048 142    0.011 294    0.018 156
DCP 4     .04[illegible]     2.70[illegible]    0.611 100    0.483  71    0.293 111    0.098  96    0.131 139    0.092 106    0.046 134    0.047 156    0.048 163
DCP 5     .074      2.363    0.816  89    0.412  62    0.273  91    0.088  57    0.114 113    0.070  87    0.055 124    0.051 133    0.046 137
DCP 6     .0[illegible]     2.114    0.770  83    0.343  48    0.222  65    0.117 353    0.050  70    0.060  32    0.047  45    0.037  33    0.020  52
DCP 7     .144      1.713    0.801  61    0.296  32    0.231  25    0.121 311    0.043 357    0.031 349    0.060   2    0.040 314    0.037 173
DCP 8     .2[illegible]      1.421    0.740  62    0.266  31    0.212  20    0.122 312    0.035 345    0.022 352    0.046 356    0.035 331    0.029 315
DCP 9     .250      1.268    0.735  51    0.211  13    0.197 349    0.111 274    0.043 260    0.028 260    0.045 268    0.037 247    0.019 219
DCP10     .3[illegible]      [illegible]    0.711  47    0.191   [illegible]    0.174 334    0.110 262    0.044 234    0.021 282    0.05[illegible] 22[illegible]    0.023 204    0.026 187
DCP11     .3[illegible]      0.96[illegible]    0.653  51    0.169 350    0.160 317    0.112 267    0.088 233    0.026 221    0.04[illegible] 210    0.026 177    [illegible]
DCP12     [illegible]      [illegible]    [illegible]    0.14[illegible] 318    0.141 306    0.136 243    0.073 203    0.019 187    0.04[illegible] 155    0.021 12[illegible]    [illegible]
DCP13     [illegible]      [illegible]    [illegible]    0.127 336    0.12[illegible] [illegible]    0.146 225    0.074 165    0.031 160    0.043 115    0.034  56    0.015  14
DCP14     [illegible]      [illegible]    [illegible]    0.14[illegible] 281    0.148 253    0.092 187    0.072 135    0.037 137    0.042  69    0.026  76    0.022 345
DCP15     [illegible]      [illegible]    [illegible]    0.145 28[illegible]    0.129 2[illegible]    0.077 167    0.069 119    0.037  75    0.031  30    0.025 17[illegible]    0.034 [illegible]
DCP16     [illegible]      [illegible]    [illegible]    0.253 26[illegible]    0.10[illegible] 219    0.098 162    0.[illegible]94  2[illegible]    0.050  57    0.028 344    0.022 255    0.01[illegible] 225
DCP17     [illegible]      [illegible]    [illegible]  2[illegible]    [illegible]    0.057 [illegible]    0.082 186    0.033 114    0.010  61    0.017   [illegible]    0.008 318    0.0[illegible] 255

                             FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

               TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.M        ALPHA.O      TEST POINT   CYCLES ANALYSED
                             65.59         0.214        0.489        5.65         0.0          16.80        12053.2       20

               V             Q             RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
               162.3         71022.        [illegible] 07     -0.287       1.856        19.00        -0.00166     2.243         0.0
              (530.5)       (1483.3)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              [illegible]    5.648 [illegible]    [illegible]  355    0.253 31[illegible]    0.035   0    0.031   2    0.016  11    0.013 221    0.006 135    0.003 209
CN                 [illegible]    0.536 [illegible]    [illegible]   52    0.055  73    0.041  13    0.027 356    0.009 322    0.006   [illegible]    0.004 27[illegible]    0.006 164
CM                 [illegible]    0.133 [illegible]    [illegible]  143    0.023 181    0.019 164    0.008 143    0.004 122    0.004 142    0.004  94    0.002 359

DCP 1     .0[illegible]      [illegible]    0.557 16[illegible]    0.15[illegible] 216    0.190 117    0.051 242    0.077  31    0.041  16    0.067  17    0.031  73    0.029  44
DCP 2     [illegible]      3.79[illegible]    0.349 1[illegible]7    0.253 227    0.117 152    0.084 211    0.082  55    0.071  90    0.048 113    0.039 106    0.046 140
DCP 3     .03[illegible]      3.[illegible]    1.271 155    0.1[illegible]2 235    0.115 232    0.038 340    0.070 335    0.054  38    0.035  84    0.010 13[illegible]    0.030 165
DCP 4     .04[illegible]      2.77[illegible]    1.031 12[illegible]    0.151 230    0.095 276    0.142 326    0.140  44    0.056  96    0.014 181    0.024 280    0.005 178
DCP 5     .074      2.31[illegible]    0.821 107    0.221 174    0.078 160    0.070 230    0.086 326    0.063  12    0.041  63    0.023  97    0.016 149
DCP 6     .094      2.0[illegible]6    0.741  9[illegible]    0.217 156    0.072 165    0.085 180    0.066 292    0.039 110    0.034  23    0.033  74    0.020  87
DCP 7     .144      1.872    0.748  76    0.241 126    0.115 156    0.067 143    0.043 206    0.052 276    0.025 315    0.023 293    0.017  39
DCP 8     .2[illegible]      1.587    0.696  73    0.242 118    0.127 150    0.072 136    0.032 182    0.041 265    0.037 293    0.024 338    0.021 349
DCP 9     .25[illegible]      1.444    0.696  63    0.276  85    0.160 101    0.064  66    0.043  85    0.042 184    0.035 103    0.036 204    0.034 217
DCP10     .300      1.244    0.662  57    0.263  72    0.156  92    0.098  51    0.043  60    0.024 160    0.026 153    0.026 179    0.018 194
DCP11     .344      1.135    0.701  56    0.235  67    0.150 100    0.091  62    0.058  57    0.023  95    0.020 130    0.011 150    0.008 211
DCP12     .501      0.937    0.674  48    0.213  41    0.113  67    0.097  28    0.059  18    0.030  38    0.018  70    0.019  61    0.012 119
DCP13     .600      0.787    0.663  44    0.219  25    0.108  39    0.100   9    0.055 356    0.034 355    0.023  25    0.015  27    0.008 135
DCP14     .701      0.679    0.612  34    0.220   8    0.107   8    0.098 334    0.062 320    0.020 300    0.021 346    0.028 324    0.002 169
DCP15     .800      0.504    0.534  35    0.203 357    0.114 352    0.093 318    0.048 287    0.027 281    0.021 323    0.023 248    0.008 164
DC 16     .900      0.197    0.361  34    0.140 339    0.082 332    0.060 307    0.029 285    0.024 286    0.034 288    0.031 264    0.015 170
DCP17     .969      0.043    0.168  42    0.076 349    0.043 329    0.032 324    0.019 317    0.014 265    0.014 312    0.015 225    0.004 244
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
               0.0        68.84       0.200       0.524       5.95        0.0          0.05        12049.1       20

              V          W           RN          CM(MIN)     CN(MAX)      ALPHA.NMAX  AERO DAMP    TOR          EXT DAMP
               175.2      79553.      0.82E 07   -0.052       0.554        6.38       -0.00066      0.950        0.0
              (574.9)    (1661.5)                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.048   5.946   0   0.517 343   0.111 204   0.057 152   0.008 108   0.022  68   0.007 177   0.001 104   0.009 133
CN                0.106   0.447 358   0.029   6   0.007 233   0.004 204   0.004 254   0.002 104   0.001 215   0.001 311   0.000  35
CM               -0.015   0.032 293   0.006 286   0.001 103   0.001  56   0.001 160   0.001 300   0.001 352   0.000  53   0.001  10

DCP 1    .010    -0.733   2.994 339   0.171 288   0.212 262   0.182 333   0.096  27   0.045  58   0.015 347   0.030  17   0.020  73
DCP 2    .020    -0.409   2.348 346   0.150 329   0.043 208   0.018 264   0.021 317   0.036  93   0.031 183   0.024 264   0.016 333
DCP 3    .030    -0.193   2.108 345   0.160 352   0.079 131   0.062 177   0.043 246   0.014  10   0.010 137   0.012 244   0.018 307
DCP 4    .049     0.128   1.753 346   0.144 345   0.074 119   0.067 163   0.053 223   0.024 297   0.014   2   0.004  34   0.006 323
DCP 5    .074     0.268   1.388 347   0.114 335   0.029 110   0.033 135   0.036 196   0.018 246   0.020 275   0.018 338   0.013  32
DCP 6    .099     0.337   1.156 349   0.086 334   0.005 198   0.017 147   0.023 193   0.008 264   0.009 318   0.012  43   0.009 132
DCP 7    .149     0.237   0.836 351   0.053 334   0.018 229   0.001 155   0.007 186   0.004 107   0.003 254   0.006 337   0.004 351
DCP 8    .200     0.183   0.666 359   0.046 351   0.016 262   0.005 296   0.003   3   0.005  69   0.002 175   0.002 307   0.004 332
DCP 9    .250     0.174   0.591 356   0.045 354   0.008 254   0.007 184   0.001 146   0.006  95   0.001 155   0.005 141   0.002 286
DCP10    .300     0.160   0.495 358   0.037   2   0.005 242   0.008 217   0.006 251   0.007 105   0.001 119   0.002 116   0.002  63
DCP11    .399     0.147   0.399  12   0.034  30   0.009 274   0.006 234   0.006 274   0.006 163   0.002 239   0.001 346   0.002  87
DCP12    .501     0.110   0.337  18   0.031  34   0.010 277   0.005 258   0.003 287   0.002 121   0.001   7   0.001 270   0.001  78
DCP13    .600     0.117   0.237  25   0.023  53   0.010 262   0.005 236   0.007 265   0.002  39   0.001  20   0.006 250   0.002 241
DCP14    .701     0.195   0.169  33   0.024  65   0.006 261   0.005 198   0.007 322   0.003  70   0.004 170   0.002 189   0.002 203
DCP15    .800     0.092   0.105  45   0.022  87   0.007 257   0.002 201   0.004 343   0.004 117   0.003 195   0.003 235   0.002 193
DCP16    .900    -0.088   0.065  86   0.018 134   0.005 178   0.005 258   0.007   0   0.004 133   0.004 148   0.004 300   0.004 173
DCP17    .965    -0.046   0.036 172   0.011 158   0.000 199   0.006 109   0.004 168   0.003 125   0.007 203   0.005  55   0.003 218
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
               0.0        68.87       0.202       0.520       5.93        0.0          2.49        12049.2       20

              V          W           RN          CM(MIN)     CN(MAX)      ALPHA.NMAX  AERO DAMP    TOR          EXT DAMP
               173.4      78562.      0.82E 07   -0.042       0.806        8.73       -0.00065      0.935        0.0
              (568.9)    (1640.8)                                  HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             2.486   5.925   0   0.502 341   0.106 197   0.016 190   0.026 153   0.019  99   0.013 204   0.008 164   0.005  91
CN                0.358   0.444 357   0.334 356   0.002 263   0.001 341   0.003 235   0.003 237   0.001 164   0.002  51   0.001 118
CM               -0.008   0.032 297   0.007 251   0.001 165   0.000 232   0.000 170   0.001 106   0.000   8   0.000 273   0.000 238

DCP 1    .010     0.452   3.174 337   0.216 265   0.133 111   0.033  12   0.024 199   0.008  38   0.016 229   0.013  91   0.012  11
DCP 2    .020     0.928   2.497 345   0.215 269   0.138 147   0.067  46   0.064 294   0.044 198   0.017 110   0.002 287   0.019  81
DCP 3    .030     0.936   2.014 344   0.116 321   0.020 302   0.019 334   0.029 264   0.041 183   0.045  91   0.048 350   0.037 244
DCP 4    .049     1.105   1.765 346   0.128 333   0.020 252   0.021 194   0.016 146   0.013  21   0.013 251   0.007 122   0.007  73
DCP 5    .074     1.036   1.411 346   0.103 316   0.013 241   0.007 219   0.008 171   0.005 104   0.002 251   0.004  57   0.008 131
DCP 6    .099     0.971   1.168 348   0.085 331   0.017 271   0.006 212   0.010 198   0.002 191   0.001 227   0.004  64   0.003 150
DCP 7    .149     0.703   0.846 351   0.061 337   0.013 279   0.010 209   0.007 208   0.001 184   0.002 278   0.005  50   0.002 152
DCP 8    .200     0.556   0.686 358   0.056 359   0.010 284   0.003 330   0.008 219   0.006 244   0.001 101   0.003 152   0.004 153
DCP 9    .250     0.493   0.583 356   0.058 356   0.013 273   0.004 300   0.016 197   0.005 163   0.016 260   0.001 158   0.003 246
DCP10    .300     0.429   0.482 357   0.050   9   0.006 262   0.002 296   0.006 196   0.005 166   0.002 168   0.001 353   0.001   1
DCP11    .399     0.362   0.385  12   0.045  23   0.002 220   0.005 291   0.003 227   0.004 268   0.002 150   0.002  26   0.003 124
DCP12    .501     0.274   0.248  17   0.034  27   0.003 338   0.004 317   0.008 264   0.005 272   0.003 169   0.003  23   0.003  89
DCP13    .600     0.243   0.224  25   0.034  41   0.004  23   0.001  24   0.004 269   0.003 308   0.001 213   0.000 250   0.001  11
DCP14    .701     0.275   0.154  33   0.033  53   0.002   2   0.003  12   0.003 260   0.004 263   0.004  29   0.002  89   0.003 166
DCP15    .800     0.133   0.094  47   0.022  57   0.003  14   0.001  69   0.000 164   0.003 243   0.001 114   0.005  92   0.004  41
DCP16    .900    -0.062   0.038  60   0.007  52   0.002 319   0.006 116   0.005  28   0.005 304   0.002 194   0.001  21   0.002 202
DCP17    .965    -0.054   0.026 175   0.004 131   0.003 249   0.003  26   0.002  17   0.002 133   0.001 266   0.001  63   0.005  14
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0          23.03        0.059        0.604        5.19         0.0           0.31       12055.1       20

                 V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                                            0.93E 07    -0.043        0.653          5.46      -0.00091      1.452        0.0
                  199.8        104077.
                 (655.4)      (2173.7)                                    HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 0.307   5.186   0    0.231   8    0.035 249    0.018 200    0.027  40    0.022  99    0.021 238    0.009 285    0.004 141
CN                    0.132   0.524 353    0.010 308    0.010 272    0.006 257    0.002  43    0.002  56    0.001 351    0.001  35    0.001 238
CM                   -0.019   0.017 316    0.003  14    0.004 117    0.000  88    0.001 130    0.000  71    0.000 264    0.000 211    0.001  60

DCP 1      .010      -0.737   2.818 347    0.200 264    0.307 306    0.185   5    0.057  73    0.043   7    0.035  60    0.011 290    0.028  20
DCP 2      .020      -0.523   2.388 349    0.075 298    0.150 306    0.123   9    0.086  98    0.001 107    0.053  74    0.043 170    0.010 308
DCP 3      .030      -0.282   2.198 348    0.103  34    0.018 231    0.036 336    0.067  97    0.044 175    0.004 245    0.022 165    0.028 228
DCP 4      .049       0.125   1.949 349    0.074  32    0.073 154    0.045 242    0.038  79    0.042 154    0.035 240    0.016 307    0.008 278
DCP 5      .074       0.353   1.737 349    0.046 336    0.099 147    0.052 217    0.019 305    0.014  66    0.022 248    0.013 309    0.011  39
DCP 6      .099       0.443   1.549 350    0.110 275    0.114 151    0.015 190    0.024 294    0.028  39    0.021 278    0.010 221    0.009  55
DCP 7      .149       0.244   0.915 350    0.062  36    0.011  10    0.045 206    0.010 263    0.017 347    0.008  46    0.006  13    0.004 195
DCP 8      .200       0.214   0.744 353    0.027 355    0.015 332    0.018 212    0.005 295    0.010  22    0.005  52    0.006  81    0.005 133
DCP 9      .250       0.209   0.725 353    0.014 345    0.018 296    0.010 219    0.001 306    0.003  14    0.003 346    0.003  69    0.000  44
DCP10      .300       0.199   0.603 353    0.009 337    0.018 297    0.004 234    0.003  73    0.001 110    0.004   0    0.003  59    0.001 194
DCP11      .399       0.184   0.477 357    0.008 299    0.016 292    0.002 283    0.001  95    0.002 238    0.004  16    0.002  49    0.002 152
DCP12      .501       0.138   0.356 359    0.008 263    0.016 291    0.003 315    0.002  64    0.001 193    0.001  10    0.002  40    0.002 220
DCP13      .600       0.153   0.260   1    0.008 248    0.016 294    0.004 298    0.003  14    0.001 116    0.001  52    0.001  96    0.005 249
DCP14      .701       0.230   0.172   3    0.002 184    0.015 288    0.004 278    0.002   7    0.002 108    0.001  70    0.002  21    0.003 258
DCP15      .800       0.101   0.083  13    0.010 205    0.015 295    0.003 298    0.002  14    0.002 165    0.002 122    0.001 315    0.003 247
DCP16      .900      -0.093   0.021 117    0.021 208    0.013 276    0.005 274    0.001 238    0.003 356    0.002 130    0.000  17    0.002 262
DCP17      .969      -0.050   0.043 172    0.009 221    0.004 255    0.002 240    0.005 355    0.001  69    0.002 331    0.001 235    0.001 191
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                  0.0          23.07        0.059        0.601        5.20         0.0           2.38       12055.2       20

                 V            Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  198.5        103397.      0.93E 07    -0.027        0.982          7.62      -0.00094      1.482        0.0
                 (651.2)      (2159.5)                                    HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 2.377   5.198   0    0.206   6    0.039 267    0.020 204    0.021  32    0.014  71    0.018 226    0.011 152    0.004   4
CN                    0.398   0.568 353    0.036 357    0.011 256    0.006 120    0.003 351    0.001 320    0.003 270    0.002 113    0.001 339
CM                   -0.006   0.024 329    0.006 247    0.002 126    0.000 316    0.001 191    0.001  89    0.001 325    0.000 234    0.000  13

DCP 1      .010       0.596   3.289 347    0.370  40    0.044  85    0.066 202    0.022 183    0.008 131    0.013 236    0.020 344    0.010 348
DCP 2      .020       0.724   2.627 349    0.144  12    0.009 311    0.016 127    0.024 243    0.048  18    0.027  28    0.033 153    0.033 230
DCP 3      .030       0.877   2.280 349    0.102 359    0.024 280    0.039  47    0.007 114    0.016  73    0.031 290    0.011 244    0.006 327
DCP 4      .049       1.128   2.026 349    0.095  17    0.052 312    0.016  64    0.032 309    0.012 180    0.026 287    0.015 201    0.008 103
DCP 5      .074       1.241   1.853 349    0.069 342    0.061 313    0.016 203    0.027 314    0.024 199    0.005 310    0.013 195    0.014  90
DCP 6      .099       1.319   1.800 350    0.100 287    0.073 321    0.063 226    0.010 329    0.044 209    0.018 113    0.013 203    0.025  95
DCP 7      .149       0.977   1.426 352    0.261 273    0.114 175    0.033 197    0.108 133    0.116  35    0.060 295    0.011  29    0.043 289
DCP 8      .200       0.617   0.875 355    0.084 331    0.060 194    0.056  82    0.029 340    0.003 287    0.011 317    0.006 256    0.006 185
DCP 9      .250       0.552   0.720 353    0.044 347    0.036 165    0.052  56    0.043 320    0.025 235    0.013 191    0.014 139    0.015  57
DCP10      .300       0.469   0.566 354    0.055  18    0.017 208    0.034  64    0.037 320    0.032 226    0.019 140    0.013  71    0.012  10
DCP11      .399       0.389   0.442 358    0.058  43    0.020 322    0.005 199    0.002 335    0.003 236    0.002 105    0.002  47    0.002 337
DCP12      .501       0.289   0.333 359    0.045  40    0.017 314    0.005 206    0.002 303    0.002 270    0.001 284    0.001  59    0.002 198
DCP13      .600       0.257   0.247   1    0.040  41    0.016 307    0.004 196    0.002  58    0.002 300    0.001 311    0.002  74    0.003 172
DCP14      .701       0.291   0.148   5    0.039  48    0.014 307    0.005 198    0.002  47    0.002 337    0.002 230    0.001  45    0.002 129
DCP15      .800       0.127   0.082  11    0.021  44    0.011 291    0.003 156    0.004  48    0.002 341    0.001 236    0.003  68    0.002 217
DCP16      .900      -0.102   0.019  31    0.002 334    0.007 270    0.003 124    0.003  53    0.002 313    0.002 151    0.001  94    0.000 270
DCP17      .969      -0.067   0.024 177    0.007 258    0.004 193    0.001  44    0.002 337    0.001 346    0.001 216    0.001 210    0.002 247
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                            FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

                 TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                   0.0          23.07          0.060        0.598         5.19          0.0           5.02         12055.3        20

                 V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TOR           EXT DAMP
                  197.3         102296.        0.93E 07    -0.019         1.154          9.48        -0.00116       1.821         0.0
                 (647.3)       (2136.5)
                                                                 HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                5.021      5.188   0     0.224  13     0.030 268     0.015 324     0.030 338     0.028 234     0.043  86     0.005 198     0.007 266
CN                   0.635      0.446 359     0.106  36     0.044 327     0.029 268     0.021 190     0.011 123     0.009  79     0.003 355     0.000  69
CM                   0.004      0.026 323     0.005 150     0.005  24     0.002 304     0.002 288     0.002 227     0.002 117     0.000  63     0.001  58

DCP 1     .010       2.045      2.332 348     0.471  47     0.100 336     0.017 324     0.025 305     0.011 275     0.012   9     0.009 191     0.005 296
DCP 2     .020       1.905      2.126 352     0.324  41     0.085 338     0.046 261     0.009 157     0.025 239     0.023 104     0.018 212     0.017 121
DCP 3     .030       1.919      1.909 352     0.262  36     0.064 332     0.048 254     0.022 150     0.024 234     0.031 109     0.012 204     0.019 113
DCP 4     .049       2.011      1.624 351     0.305  50     0.083 354     0.065 304     0.061 163     0.027 128     0.055  86     0.021 351     0.007 105
DCP 5     .074       1.995      1.441 350     0.335  60     0.169 354     0.103 305     0.086 204     0.047 113     0.057  80     0.038   4     0.010 287
DCP 6     .099       1.956      1.335 350     0.416  65     0.282 345     0.095 304     0.070 226     0.040  83     0.030  98     0.050  25     0.015 358
DCP 7     .149       1.421      1.080 358     0.250  36     0.281 338     0.147 264     0.097 294     0.139 220     0.014 158     0.088 202     0.041 125
DCP 8     .200       1.056      0.819   3     0.162 358     0.058 317     0.104 265     0.080 185     0.024 155     0.038 125     0.014  84     0.012 122
DCP 9     .250       0.909      0.673 354     0.106 350     0.024 286     0.069 253     0.077 165     0.034 102     0.040 102     0.038  38     0.016 351
DCP10     .300       0.766      0.530   1     0.103 357     0.027 270     0.049 250     0.068 168     0.044  96     0.036  75     0.037  18     0.022 323
DCP11     .399       0.595      0.363   5     0.086  29     0.017 282     0.012 244     0.027 163     0.030  78     0.019   6     0.012 306     0.007 275
DCP12     .501       0.426      0.246  10     0.084  37     0.018 294     0.006 227     0.011 144     0.013  59     0.006 341     0.004 270     0.003 255
DCP13     .600       0.341      0.155  18     0.082  44     0.020 308     0.005 259     0.006 183     0.009  72     0.004 340     0.004 263     0.004 236
DCP14     .701       0.326      0.067  49     0.083  50     0.018 315     0.003 324     0.004 228     0.003  75     0.003 290     0.003 209     0.002 181
DCP15     .800       0.145      0.053  51     0.044  32     0.014 265     0.005 138     0.004 107     0.004  24     0.005 268     0.003 178     0.003 167
DCP16     .900      -0.087      0.037  35     0.021 327     0.015 225     0.006 143     0.003 132     0.004  50     0.004 290     0.002 195     0.002 132
DCP17     .969      -0.076      0.008 149     0.013 285     0.004 237     0.003 225     0.004 124     0.003  56     0.003 266     0.001 134     0.000 286
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                            FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1

                 TUNED HZ      DRIVE HZ      K             MACH NO       DEL.ALPHA     DEL.H         ALPHA.O       TEST POINT    CYCLES ANALYSED
                   0.0          23.01          0.060        0.591         5.07          0.0           7.49         12055.4        20

                 V             Q             RN            CM(MIN)       CN(MAX)       ALPHA.NMAX    AERO DAMP     TOR           EXT DAMP
                  194.6         98207.         0.90E 07    -0.035         1.237          9.97        -0.00129       2.001         0.0
                 (638.6)       (2051.1)
                                                                 HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0      RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                7.489      5.065   0     0.254  27     0.031 275     0.029  86     0.053  39     0.063   4     0.110 222     0.025 171     0.008  55
CN                   0.805      0.266  14     0.144  53     0.038  33     0.033  17     0.029 325     0.014 278     0.012 271     0.004 208     0.003 125
CM                  -0.002      0.020 252     0.020 100     0.005   8     0.005  90     0.004  14     0.002   5     0.001 318     0.002 311     0.001 223

DCP 1     .010       2.930      1.327 350     0.596  62     0.121  44     0.072  10     0.017 302     0.031 235     0.045 158     0.019  72     0.026  67
DCP 2     .020       2.677      1.255 352     0.508  71     0.172  36     0.097  19     0.082 325     0.039 292     0.043 220     0.017  68     0.028 117
DCP 3     .030       2.592      1.123 351     0.444  75     0.193  35     0.095   9     0.086 325     0.049 317     0.059 250     0.008 134     0.026 124
DCP 4     .049       2.476      0.631 348     0.564  76     0.160  36     0.053  46     0.117 347     0.061 299     0.063 276     0.029 273     0.019 209
DCP 5     .074       2.348      0.420 344     0.661  73     0.119  35     0.092  67     0.132 354     0.054 273     0.058 301     0.045 266     0.025 222
DCP 6     .099       2.251      0.311 353     0.763  70     0.091  90     0.157  61     0.113 356     0.043 247     0.079 306     0.042 262     0.024 247
DCP 7     .149       1.666      0.445  20     0.565  63     0.126  25     0.264  51     0.062   5     0.112  27     0.060 104     0.056  21     0.063  86
DCP 8     .200       1.298      0.501  22     0.277  53     0.166  12     0.073  11     0.106 333     0.023 310     0.041 322     0.012 322     0.005  58
DCP 9     .250       1.161      0.472  11     0.178  46     0.129 357     0.050 326     0.096 313     0.039 265     0.064 286     0.031 225     0.022 271
DCP10     .300       0.967      0.406  14     0.126  32     0.066   3     0.351 311     0.064 312     0.050 260     0.065 267     0.028 227     0.027 262
DCP11     .399       0.768      0.314  18     0.077  16     0.020  50     0.033 320     0.022 207     0.027 255     0.024 238     0.021 186     0.009 170
DCP12     .501       0.577      0.233  24     0.062   8     0.012 101     0.021 318     0.010 266     0.018 246     0.012 144     0.009 172     0.012 146
DCP13     .600       0.450      0.159  36     0.050   4     0.022 135     0.015 347     0.007 251     0.009 236     0.007 202     0.010 135     0.006  66
DCP14     .701       0.389      0.098  70     0.044 357     0.031 159     0.010  19     0.008 204     0.008 153     0.006  78     0.007  92     0.006  51
DCP15     .800       0.149      0.087  49     0.039 318     0.018 156     0.012 315     0.013 192     0.005 124     0.004 102     0.008  97     0.005  30
DCP16     .900      -0.050      0.083  21     0.038 296     0.004 279     0.011 275     0.007 208     0.006 183     0.004 115     0.007 118     0.007  31
DCP17     .969      -0.072      0.026  23     0.022 287     0.003 316     0.008 298     0.004 232     0.004 192     0.001  77     0.004 148     0.003  50
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FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.03	0.060	0.591	4.96	0.0	10.00	12055.5	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
194.1 (636.7)	97393. (2034.1)	0.90E 07	-0.071	1.243	10.18	-0.00135	2.092	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.996	4.956	0	0.261	24	0.058	219	0.022	128	0.008	138	0.037	123	0.061	92	0.008	12	0.015	332
CN		0.930	0.148	48	0.095	70	0.053	125	0.021	101	0.025	109	0.009	48	0.011	111	0.002	68	0.005	96
CM		-0.013	0.045	204	0.322	90	0.007	188	0.003	106	0.002	182	0.002	163	0.002	178	0.001	124	0.002	173
DCP 1	.010	3.379	0.194	358	0.536	74	0.112	77	0.016	94	0.039	2	0.030	342	0.020	253	0.010	38	0.014	303
DCP 2	.020	3.075	0.288	355	0.596	91	0.107	92	0.045	121	0.047	86	0.006	57	0.023	302	0.020	34	0.017	7
DCP 3	.030	2.908	0.236	351	0.572	81	0.087	110	0.094	110	0.058	78	0.022	145	0.023	353	0.012	11	0.006	27
DCP 4	.049	2.746	0.118	217	0.461	69	0.108	156	0.155	111	0.086	130	0.035	115	0.030	112	0.024	96	0.008	132
DCP 5	.074	2.618	0.258	177	0.368	82	0.189	164	0.142	100	0.087	137	0.056	100	0.041	132	0.030	116	0.021	132
DCP 6	.099	2.498	0.497	166	0.288	76	0.268	158	0.095	97	0.113	145	0.062	89	0.056	143	0.025	119	0.032	145
DCP 7	.149	1.951	0.391	133	0.348	79	0.366	147	0.139	213	0.015	288	0.007	222	0.027	236	0.016	21	0.035	182
DCP 8	.200	1.434	0.290	63	0.359	83	0.129	123	0.093	97	0.062	138	0.004	204	0.014	172	0.009	286	0.010	99
DCP 9	.250	1.266	0.242	41	0.262	67	0.069	106	0.096	53	0.100	123	0.009	105	0.055	125	0.028	181	0.018	180
DCP10	.300	1.110	0.254	36	0.175	66	0.049	88	0.081	61	0.079	114	0.032	64	0.064	115	0.028	131	0.019	101
DCP11	.349	0.910	0.261	34	0.057	34	0.029	66	0.022	61	0.029	72	0.024	29	0.026	78	0.014	24	0.016	70
DCP12	.501	0.693	0.247	33	0.031	336	0.027	64	0.001	290	0.016	72	0.011	22	0.013	68	0.008	14	0.013	47
DCP13	.600	0.542	0.205	38	0.049	279	0.031	63	0.010	265	0.011	48	0.008	352	0.011	12	0.009	292	0.008	47
DCP14	.701	0.461	0.154	43	0.073	265	0.020	86	0.019	235	0.006	43	0.007	311	0.005	326	0.009	302	0.008	305
DCP15	.800	0.268	0.159	28	0.060	269	0.016	60	0.012	252	0.004	349	0.007	323	0.007	282	0.002	290	0.008	336
DCP16	.900	0.010	0.148	9	0.032	271	0.013	6	0.006	100	0.008	337	0.006	15	0.006	313	0.003	329	0.006	315
DCP17	.965	-0.052	0.057	12	0.012	302	0.007	346	0.005	68	0.004	35	0.007	5	0.004	357	0.004	263	0.002	326

FORCED PITCHING OSCILLATION AIRFOIL NLR 1

TUNED HZ	DRIVE HZ	K	MACH NO	DEL.ALPHA	DEL.H	ALPHA.0	TEST POINT	CYCLES ANALYSED
0.0	23.17	0.063	0.631	4.59	0.0	9.82	12057.1	20

V	Q	RN	CN(MIN)	CN(MAX)	ALPHA.NMAX	AERO DAMP	TDR	EXT DAMP
198.0 (649.7)	102248. (2135.5)	0.92E 07	-0.362	1.175	13.34	-0.00132	2.377	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.817	4.586	3	0.242	16	0.064	177	0.016	5	0.017	35	0.019	101	0.036	3	0.040	261	0.002	299
CN		0.912	0.138	48	0.084	72	0.042	124	0.018	48	0.016	95	0.009	71	0.004	37	0.001	68	0.003	65
CM		-0.012	0.017	237	0.017	57	0.007	166	0.002	113	0.005	148	0.003	168	0.002	95	0.002	87	0.001	108
DCP 1	.010	3.215	0.244	355	0.673	75	0.164	105	0.029	135	0.012	350	0.024	53	0.017	1	0.014	30	0.011	16
DCP 2	.020	3.029	0.363	356	0.521	80	0.091	111	0.056	135	0.069	100	0.017	137	0.019	340	0.025	40	0.014	66
DCP 3	.030	2.971	0.443	1	0.499	75	0.071	82	0.065	131	0.067	76	0.016	227	0.017	336	0.019	340	0.005	82
DCP 4	.049	2.877	0.374	225	0.409	19	0.127	179	0.156	137	0.046	132	0.072	148	0.021	100	0.046	138	0.028	109
DCP 5	.074	2.546	0.252	176	0.366	76	0.156	174	0.157	49	0.074	155	0.077	101	0.031	145	0.052	116	0.012	110
DCP 6	.099	2.426	0.515	171	0.205	50	0.266	263	0.135	40	0.104	150	0.064	136	0.061	134	0.025	108	0.026	149
DCP 7	.149	1.844	0.367	159	0.256	61	0.169	144	0.140	219	0.014	144	0.144	160	0.025	232	0.032	47	0.018	178
DCP 8	.200	1.356	0.274	56	0.304	87	0.152	122	0.078	133	0.077	136	0.010	153	0.021	148	0.006	72	0.004	50
DCP 9	.250	1.271	0.255	86	0.190	61	0.373	57	0.069	13	0.082	71	0.008	13	0.063	49	0.014	147	0.016	60
DCP10	.300	1.112	0.272	35	0.123	62	0.363	41	0.069	26	0.054	55	0.028	39	0.044	44	0.008	39	0.026	54
DCP11	.349	0.907	0.248	32	0.044	45	0.369	25	0.017	26	0.026	17	0.013	17	0.021	16	0.015	297	0.008	23
DCP12	.501	0.688	0.224	33	0.024	339	0.023	16	0.002	18	0.011	348	0.009	36	0.013	343	0.013	273	0.007	18
DCP13	.600	0.550	0.176	39	0.034	287	0.010	32	0.011	172	0.006	317	0.009	56	0.015	287	0.005	249	0.010	304
DCP14	.701	0.446	0.122	53	0.047	249	0.009	110	0.014	148	0.008	352	0.009	358	0.015	249	0.010	236	0.006	242
DCP15	.800	0.250	0.124	81	0.040	251	0.005	54	0.006	153	0.004	234	0.008	12	0.013	238	0.003	210	0.003	214
DCP16	.900	0.000	0.120	13	0.020	273	0.009	333	0.002	336	0.035	242	0.007	330	0.010	216	0.002	344	0.006	265
DCP17	.965	-0.047	0.051	13	0.008	281	0.011	337	0.003	315	0.031	64	0.007	357	0.005	258	0.006	294	0.003	260

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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
               0.0        23.18      0.060      0.601      4.89       0.0        12.19      12057.2      20

              V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR         EXT DAMP
               197.6     102033.     0.92E 07  -0.083      1.164      10.00     -0.00122     1.922       0.0
              (648.3)    (2131.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            12.191   4.890   0   0.242  10   0.040 240   0.018 279   0.026  36   0.016 342   0.022 296   0.030 283   0.004 109
CN                0.965   0.130  79   0.014 144   0.023 177   0.017 219   0.010 238   0.008 208   0.006 315   0.004 352   0.001 330
CM               -0.022   0.058 195   0.001 132   0.006 158   0.003 284   0.001 315   0.002 308   0.001 101   0.001  87   0.001 234

DCP 1    .010     3.196   0.353 148   0.259  68   0.143 152   0.045  34   0.058 162   0.022  25   0.016 138   0.018  53   0.015  71
DCP 2    .020     3.184   0.345 142   0.240  71   0.149 153   0.032  50   0.039 177   0.010 133   0.013 135   0.008 159   0.022  77
DCP 3    .030     3.114   0.206 170   0.257  92   0.111 167   0.034 104   0.035 206   0.011 176   0.016 109   0.004  21   0.005 219
DCP 4    .049     2.725   0.522 170   0.113  63   0.178 185   0.057 252   0.054 214   0.036 241   0.012 257   0.005 299   0.014 314
DCP 5    .074     2.574   0.591 168   0.027   4   0.153 174   0.115 258   0.029 250   0.056 243   0.016  19   0.011 315   0.014  18
DCP 6    .099     2.419   0.732 164   0.135 253   0.110 161   0.131 249   0.050 303   0.028 218   0.026   5   0.026  16   0.003 221
DCP 7    .149     1.997   0.554 145   0.224 232   0.055 292   0.048 311   0.003  34   0.009 222   0.030  72   0.017 119   0.017 231
DCP 8    .200     1.567   0.265 114   0.088 171   0.086 179   0.034 248   0.013 306   0.006 189   0.011 358   0.019  31   0.006 166
DCP 9    .250     1.468   0.231 108   0.048 167   0.076 162   0.064 220   0.025 255   0.016 271   0.020 321   0.006  11   0.014 350
DCP10    .300     1.243   0.189  64   0.068  98   0.074 152   0.064 212   0.032 254   0.019 262   0.029 296   0.013 330   0.010 309
DCP11    .399     1.035   0.251  43   0.075  83   0.031 136   0.036 172   0.021 220   0.015 236   0.023 264   0.010 312   0.006 226
DCP12    .501     0.762   0.246  34   0.026  78   0.008 347   0.024 146   0.007 241   0.016 174   0.009 247   0.005 341   0.006 240
DCP13    .600     0.591   0.230  28   0.007 333   0.025 317   0.008 109   0.005 181   0.007 135   0.004 329   0.004 284   0.006 104
DCP14    .701     0.475   0.189  26   0.037 244   0.033 320   0.008  68   0.007 205   0.014 127   0.004  37   0.003 146   0.004 115
DCP15    .800     0.248   0.196  19   0.021 249   0.019 329   0.009  74   0.005 121   0.008 110   0.004  61   0.002 217   0.007  49
DCP16    .900     0.037   0.153  12   0.015  19   0.004 267   0.010  85   0.002  85   0.003 154   0.002 342   0.002 317   0.006   8
DCP17    .969    -0.035   0.058  15   0.012  44   0.006  67   0.001 345   0.007  85   0.000  89   0.003 227   0.002 257   0.004  24

                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
               0.0        23.12      0.060      0.599      4.92       0.0        14.85      12057.3      20

              V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR         EXT DAMP
               196.6     100960.     0.92E 07  -0.100      1.167      17.48     -0.00145     2.269       0.0
              (645.1)    (2108.6)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            14.849   4.922   0   0.208   4   0.025 279   0.021 209   0.033  10   0.023  29   0.011  74   0.028 130   0.010 305
CN                1.010   0.147  71   0.013 251   0.039 348   0.005 213   0.004 245   0.008 287   0.002  11   0.004 185   0.003 202
CM               -0.043   0.054 149   0.006 233   0.001 135   0.001  40   0.002 339   0.002  38   0.001  22   0.002 328   0.001  47

DCP 1    .010     3.250   0.392 144   0.052  55   0.021 139   0.019 293   0.002 154   0.026 290   0.012 332   0.035 276   0.006 120
DCP 2    .020     3.321   0.430 143   0.337  41   0.073 121   0.051 238   0.026 157   0.029 345   0.024 327   0.045 266   0.006 102
DCP 3    .030     3.001   0.624 164   0.353  35   0.150 174   0.019 259   0.018 282   0.032 260   0.039 286   0.036 198   0.007 240
DCP 4    .049     2.656   0.539 150   0.168 251   0.050 278   0.057 299   0.022 335   0.012 321   0.022  32   0.003  92   0.006   1
DCP 5    .074     2.456   0.526 140   0.219 251   0.088 345   0.032 353   0.040 356   0.030  77   0.015  85   0.005 198   0.004 232
DCP 6    .099     2.220   0.442 136   0.147 252   0.062 351   0.018  57   0.019  30   0.007  31   0.024  10   0.009   9   0.015  21
DCP 7    .149     1.800   0.228 100   0.015 338   0.050  23   0.015 137   0.016 276   0.017   9   0.027  72   0.017 258   0.007 266
DCP 8    .200     1.495   0.125 132   0.056 245   0.328 337   0.020 273   0.004  16   0.017 290   0.010 174   0.011 230   0.009  77
DCP 9    .250     1.452   0.148 101   0.033 227   0.015 343   0.012 200   0.032 279   0.028 308   0.001  84   0.004 232   0.002 129
DCP10    .300     1.292   0.150  85   0.034 191   0.007  63   0.011 155   0.021 249   0.017 327   0.004  42   0.005 170   0.010 179
DCP11    .399     1.065   0.196  60   0.031 158   0.012 102   0.018 173   0.013 230   0.023 296   0.012 322   0.006  51   0.014 169
DCP12    .501     0.858   0.222  45   0.025  98   0.037  28   0.013 142   0.017 173   0.019 267   0.009 337   0.004 143   0.001 200
DCP13    .600     0.665   0.233  32   0.033  48   0.009   0   0.005 151   0.008 133   0.006 236   0.004  20   0.014 144   0.005 187
DCP14    .701     0.550   0.221  27   0.020  31   0.018 307   0.008 273   0.009 166   0.010 177   0.007 161   0.007 149   0.005 304
DCP15    .800     0.372   0.216  20   0.017   9   0.011 295   0.010 274   0.006 126   0.006 160   0.007 193   0.010 166   0.005 246
DCP16    .900     0.105   0.149  27   0.021  17   0.010 238   0.003 303   0.004   0   0.011 217   0.010 197   0.004 231   0.004 229
DCP17    .969    -0.008   0.058  36   0.010  34   0.002 220   0.005 308   0.032 132   0.001  70   0.036 212   0.004 178   0.007 241
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

        TUNNEL HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT   CYCLES ANALYSED
          0.0        23.15       0.063      0.596      4.97        0.0        17.15       12057.4       20

        V           Q           RN          CM(MIN)    CN(MAX)     ALPHA,NMAX AERO DAMP   TOR          EXT DAMP
        195.4       99524.       3.91E 07   -0.119      1.193       18.95     -0.00199     3.344        0.0
        (641.2)     (2078.6)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.150   4.936   0   0.193   7   0.061 273   0.016 195   0.027  37   0.010  59   0.010 218   0.034 124   0.009 309
CN                1.010   0.141  60   0.027  52   0.008 232   0.002  55   0.004 343   0.002 313   0.005 281   0.001   1   0.002 190
CM               -0.077   0.045 213   0.007 236   0.005  43   0.032 238   0.000 151   0.001 169   0.001  54   0.000  95   0.001  53

DCP 1    .010     5.161   0.519 150   0.030 114   0.125 136   0.053 223   0.034 352   0.021 176   0.009 236   0.015 141   0.015 156
DCP 2    .020     5.213   0.428 137   0.341 137   0.026  73   0.062 222   0.041 288   0.024  69   0.016 317   0.026 321   0.012  39
DCP 3    .030     2.933   0.519 165   0.085   0   0.163 229   0.015 142   0.016 113   0.017 167   0.023 313   0.018   4   0.007 261
DCP 4    .040     2.518   0.417 124   0.132 320   0.061  36   0.014 151   0.015  16   0.018 166   0.027 310   0.016  63   0.022 110
DCP 5    .076     2.160   0.244 137   0.054  14   0.017  59   0.016 217   0.015   4   0.001 231   0.015 306   0.002  22   0.006  70
DCP 6    .095     1.932   0.165  49   0.025  55   0.036 166   0.018 169   0.004 147   0.011 255   0.019 314   0.011 349   0.013  73
DCP 7    .144     1.698   0.110  76   0.029  88   0.007 327   0.012 139   0.004 249   0.007 280   0.007 284   0.014 358   0.010 298
DCP 8    .200     1.486   0.085  78   0.028  41   0.007 159   0.014 100   0.005 211   0.006 161   0.011 296   0.003 205   0.005 185
DCP 9    .250     1.405   0.148  41   0.013 113   0.026 177   0.017 262   0.014  51   0.003  57   0.012 133   0.008 264   0.008  52
DCP10    .330     1.274   0.150  87   0.014 132   0.024 185   0.007 311   0.002 351   0.007 315   0.011 125   0.012 211   0.002 175
DCP11    .399     1.125   0.121  67   0.028  73   0.011 178   0.008  78   0.006 327   0.009 305   0.005 293   0.009 125   0.006 224
DCP12    .500     0.935   0.180  53   0.038  80   0.001 181   0.010  33   0.007   0   0.005   7   0.013 275   0.009  58   0.013 176
DCP13    .600     0.774   0.210  46   0.045  52   0.010 242   0.006  70   0.011 330   0.004 324   0.007 283   0.004  39   0.005 261
DCP14    .700     0.653   0.234  38   0.037  54   0.018 218   0.004  11   0.004 263   0.004 262   0.008 265   0.003 357   0.002 255
DCP15    .800     0.481   0.195  31   0.032  49   0.017 234   0.005  18   0.002 211   0.007  26   0.003 260   0.006 296   0.002 237
DCP16    .900     0.172   0.143  38   0.021  39   0.013 233   0.007  66   0.003  17   0.004 353   0.002 116   0.005 238   0.004 284
DCP17    .960     0.015   0.352  34   0.015 359   0.005 246   0.005  28   0.005 153   0.001 168   0.003 144   0.001 354   0.003 160


                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

        TUNNEL HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT   CYCLES ANALYSED
          0.0        23.20       0.059      0.606      5.19        0.0        0.33        12059.1       20

        V           Q           RN          CM(MIN)    CN(MAX)     ALPHA,NMAX AERO DAMP   TOR          EXT DAMP
        199.7       69465.       3.62E 07   -0.026      0.563        5.53     -0.00066     1.045        0.0
        (655.2)     (1450.8)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5         , 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             0.328   5.194   0   0.202   4   0.061 273   0.023 179   0.028          .026 121   0.027 218   0.003 194   0.006 334
CN                0.143   0.420 355   0.012 231   0.004 291   0.001  29   0.002 ...      .001 146   0.030 231   0.005 219   0.002 131
CM               -0.017   0.039 265   0.001 338   0.003 106   0.001  19   0.001 187   0.000 169   0.000 111   0.001 358   0.000 110

DCP 1    .010    -0.690   1.944 347   0.175 275   0.195 126   0.042   8   0.034  50   0.039  97   0.013 205   0.014 232   0.014 103
DCP 2    .020    -0.472   1.675 349   0.113 266   0.045 131   0.024 337   0.038  64   0.011 127   0.005 188   0.007 298   0.015 155
DCP 3    .030    -0.185   1.522 351   0.070 253   0.013 130   0.017   5   0.007 254   0.009 148   0.009  82   0.012 265   0.017 124
DCP 4    .040     0.193   1.372 342   0.061 214   0.009 133   0.019  21   0.004 168   0.014 213   0.006  47   0.019 242   0.011 142
DCP 5    .076     0.425   1.133 351   0.044 220   0.007  96   0.020  41   0.008 217   0.011 170   0.005  18   0.016 227   0.008 133
DCP 6    .095     0.926   1.054 350   0.050 235   0.006  38   0.011  73   0.010 249   0.007 142   0.003  76   0.013 231   0.003 146
DCP 7    .144     0.287   0.848 344   0.044 162   0.013 357   0.020 139   0.004 276   0.004  37   0.007 165   0.013 254   0.014 137
DCP 8    .200     0.227   0.521 356   0.026 253   0.011 152   0.010  40   0.002 278   0.005 193   0.006 176   0.009 265   0.007 102
DCP 9    .250     0.205   0.701 353   0.009 311   0.022 298   0.008 231   0.004 315   0.002 171   0.002  37   0.007 155   0.001 114
DCP10    .330     0.167   0.587 353   0.012 343   0.018 331   0.003 233   0.002 290   0.001 341   0.002 330   0.001 203   0.005 102
DCP11    .399     0.181   0.461 358   0.006 337   0.013 299   0.003 259   0.003 356   0.001 202   0.002 225   0.005 212   0.000  36
DCP12    .500     0.136   0.344   0   0.004 257   0.017 293   0.002 321   0.003 349   0.001  24   0.001 268   0.005 172   0.001 160
DCP13    .600     0.149   0.252   2   0.003 225   0.013 290   0.001 265   0.003 348   0.002  61   0.001 244   0.004 179   0.001  43
DCP14    .700     0.226   0.163   4   0.003 139   0.012 288   0.001  96   0.003  49   0.001 321   0.000 330   0.003 157   0.001 246
DCP15    .800     0.130   0.074  16   0.007 140   0.011 269   0.002 272   0.002 357   0.001 328   0.001 357   0.003 217   0.002 199
DCP16    .900    -0.049   0.023 141   0.019 225   0.011 277   0.003 196   0.003 330   0.001  45   0.002 235   0.003 219   0.004 250
DCP17    .960    -0.051   0.040 170   0.005 202   0.005 217   0.001 196   0.002  49   0.002  33   0.001  36   0.004 236   0.002  26
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                   TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.0    TEST POINT  CYCLES ANALYSED
                    0.0        23.33      0.060      0.605      5.20       0.0          2.41     12059.2      20

                   V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TDR         EXT DAMP
                    199.3      69292.     0.62E 07  -0.040      0.910       7.52      -0.00096    1.522       0.0
                   (653.9)    (1447.2)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              2.407    5.201   0  0.275 359  0.098 301  0.029 103  0.042  22  0.020 145  0.018  22  0.164   6  0.025 177
CN                 0.345    0.548 354  0.031 340  0.018 316  0.010 174  0.008  45  0.003 202  0.012  14  0.040  15  0.007 179
CM                 0.002    0.024 330  0.002 210  0.004 171  0.001 304  0.002 207  0.002  25  0.004 198  0.015 196  0.002 353

DCP 1     .010     0.306    3.169 347  0.300  47  0.033 357  0.063 224  0.012 145  0.027 131  0.011 181  0.010 303  0.006 259
DCP 2     .020     0.750    2.595 350  0.150  27  0.038 138  0.060 203  0.061 291  0.067  20  0.039  60  0.035 170  0.022 249
DCP 3     .030     0.929    2.200 350  0.084 348  0.035 303  0.033  59  0.005   3  0.014  90  0.021 304  0.012 232  0.002 337
DCP 4     .049     1.147    1.954 350  0.073  12  0.062 318  0.015  93  0.034 316  0.017 191  0.016 304  0.015 210  0.004 103
DCP 5     .074     1.253    1.799 350  0.055 333  0.071 323  0.023 206  0.024 323  0.027 195  0.005 101  0.011 210  0.010  88
DCP 6     .099     1.297    1.720 351  0.094 290  0.084 323  0.079 226  0.021 111  0.020 215  0.019 127  0.000 146  0.010  92
DCP 7     .149     0.952    1.342 353  0.225 280  0.087 197  0.065 194  0.103 126  0.078  38  0.023 307  0.017  17  0.026 286
DCP 8     .200     0.629    0.861 355  0.068 310  0.062 176  0.061  73  0.032 338  0.002 279  0.014 285  0.009 227  0.007 156
DCP 9     .250     0.361    0.675 354  0.048  11  0.026 302  0.013 127  0.024 347  0.013 265  0.012  10  0.043  14  0.017 138
DCP10     .300     0.324    0.558 353  0.043  25  0.031 330  0.006 102  0.005   2  0.013 227  0.014  47  0.040 359  0.003 154
DCP11     .399     0.279    0.450 357  0.032  26  0.035 329  0.009 191  0.007   9  0.010 229  0.017  35  0.056  13  0.012 171
DCP12     .501     0.210    0.338 359  0.031  28  0.028 315  0.008 241  0.007  51  0.007 251  0.012   9  0.052  25  0.014 191
DCP13     .600     0.199    0.234   2  0.021   7  0.023 336  0.010 189  0.009  41  0.002 166  0.015   4  0.056  20  0.007 202
DCP14     .701     0.252    0.152   6  0.018  27  0.019 331  0.011 138  0.013  37  0.008 197  0.020  24  0.055  17  0.005 227
DCP15     .800     0.109    0.068  19  0.019 348  0.014 350  0.003 100  0.008  10  0.014 192  0.016  18  0.062  17  0.006 151
DCP16     .900    -0.099    0.009 112  0.007 286  0.014  31  0.005 131  0.012  39  0.006 191  0.022  19  0.060   8  0.020 162
DCP17     .969    -0.061    0.040 170  0.018 272  0.016 336  0.006 173  0.009  27  0.012 197  0.013   2  0.048  24  0.005 185
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                   TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H       ALPHA.0    TEST POINT  CYCLES ANALYSED
                    0.0        23.25      0.060      0.601      5.20       0.0          4.89     12059.3      20

                   V          Q          RN         CM(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TDR         EXT DAMP
                    197.8      68526.     0.62E 07  -0.016      0.954       9.56      -0.00103    1.630       0.0
                   (649.1)    (1431.2)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0     RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              4.887    5.204   0  0.208  14  0.059 289  0.008 208  0.032 352  0.012 246  0.029 128  0.008  91  0.012 297
CN                 0.603    0.363   0  0.068  45  0.013   9  0.004 351  0.004 101  0.007  50  0.006  11  0.005 348  0.004 302
CM                 0.002    0.016 302  0.010 186  0.007  75  0.003 352  0.001 289  0.001 263  0.001 104  0.001  78  0.000 240

DCP 1     .010     1.773    1.824 349  0.218  80  0.068  41  0.010  44  0.016  51  0.012  10  0.004  73  0.007  19  0.005 140
DCP 2     .020     1.841    1.625 352  0.152  73  0.052  45  0.027 342  0.008 261  0.013  12  0.012 336  0.010  51  0.005 317
DCP 3     .030     1.860    1.445 352  0.131  66  0.038  46  0.034 353  0.021 279  0.009  15  0.013 305  0.004  82  0.005 341
DCP 4     .049     1.921    1.201 350  0.164  90  0.075  66  0.059  22  0.044 291  0.015 220  0.010 276  0.006 172  0.003 196
DCP 5     .074     1.868    1.015 349  0.198 102  0.136  66  0.071  28  0.040 328  0.016 242  0.009 324  0.008 247  0.005 229
DCP 6     .099     1.788    0.907 350  0.221 101  0.178  57  0.055  37  0.036  11  0.006 187  0.022  24  0.008 313  0.004 208
DCP 7     .149     1.334    0.778 358  0.108  74  0.158  50  0.080 351  0.043  39  0.054 358  0.026  41  0.039  19  0.007 253
DCP 8     .200     1.018    0.614   1  0.067  32  0.034  38  0.064 345  0.043 282  0.013 260  0.016 328  0.007 284  0.009 273
DCP 9     .250     0.859    0.643   1  0.127 353  0.047 264  0.055 235  0.060 163  0.044  93  0.026  71  0.028  26  0.021 325
DCP10     .300     0.723    0.491   1  0.099   4  0.040 250  0.030 200  0.041 138  0.033  67  0.019  25  0.019 346  0.018 306
DCP11     .399     0.571    0.349   7  0.093  27  0.027 273  0.017 185  0.014 123  0.012  67  0.007  23  0.007 352  0.009 306
DCP12     .501     0.417    0.248  11  0.083  31  0.027 277  0.010 168  0.007  96  0.006  69  0.005   9  0.004 302  0.003 266
DCP13     .600     0.333    0.160  20  0.080  40  0.024 289  0.010 171  0.008  73  0.007  17  0.003 280  0.004 244  0.001 338
DCP14     .701     0.323    0.072  45  0.072  46  0.017 302  0.004 157  0.002 312  0.001 222  0.003 291  0.002 210  0.002  60
DCP15     .800     0.144    0.050  48  0.037  32  0.010 267  0.004 121  0.003  72  0.001 201  0.003 283  0.004 240  0.004 115
DCP16     .900    -0.087    0.037  27  0.022 308  0.015 219  0.009 133  0.005  69  0.002 100  0.003 265  0.002 276  0.003  70
DCP17     .969    -0.075    0.010 170  0.009 295  0.006 255  0.004 154  0.004  46  0.001  77  0.003 327  0.003 304  0.000  96
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        23.26       0.060      0.600      5.06       0.0         6.60     12059.4       20

               V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TDR         EXT DAMP
                197.4     68397.      0.62E 07   -0.029      1.097        9.79     -0.00112    1.766       0.0
               (647.6)   (1428.5)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             6.596    5.063   0  0.249  19  0.044 263  0.008  83  0.033  27  0.035 359  0.051 181  0.034 114  0.003 130
CN                0.709    0.294   9  0.133  49  0.030 357  0.017   6  0.014 323  0.008 287  0.006 220  0.010 129  0.000  99
CM               -0.003    0.016 263  0.015 102  0.005   7  0.002 100  0.001  26  0.001  69  0.002 354  0.003 286  0.000 137

DCP 1     .010    2.345    1.624 350  0.503  58  0.062  15  0.034  18  0.008 311  0.010 240  0.016 130  0.006 168  0.006  19
DCP 2     .020    2.343    1.567 353  0.387  58  0.091   8  0.034  18  0.031 311  0.008 276  0.006 210  0.006 170  0.006  64
DCP 3     .030    2.335    1.376 353  0.349  60  0.109   6  0.026 347  0.033 327  0.019 309  0.013 249  0.005 199  0.011 150
DCP 4     .049    2.188    0.814 349  0.543  74  0.172  14  0.029 314  0.036 352  0.022 320  0.021 301  0.016 271  0.013 234
DCP 5     .074    2.075    0.591 349  0.613  72  0.137  12  0.045  36  0.049 345  0.013 234  0.015 334  0.007 301  0.011 293
DCP 6     .099    1.948    0.468 354  0.672  70  0.099  10  0.099  49  0.033 357  0.008  24  0.021 305  0.014 162  0.020 331
DCP 7     .149    1.462    0.571   9  0.471  62  0.163 359  0.117  42  0.054 340  0.035  23  0.013  86  0.014 191  0.036  89
DCP 8     .200    1.156    0.547  12  0.227  46  0.128 348  0.031 303  0.041 326  0.016 290  0.009 257  0.008  44  0.005 331
DCP 9     .250    1.004    0.472  11  0.162  29  0.069 340  0.022 292  0.033 318  0.020 271  0.019 271  0.013 177  0.011 262
DCP10     .300    0.856    0.380  11  0.121  20  0.029 321  0.019 313  0.024 293  0.015 260  0.019 250  0.020 173  0.011 193
DCP11     .399    0.688    0.294  18  0.093  21  0.006 305  0.014 343  0.011 311  0.015 276  0.012 208  0.015 [illegible]  0.005 167
DCP12     .501    0.516    0.230  20  0.069  15  0.006 161  0.016   2  0.012 312  0.015 276  0.016 197  0.014 [illegible]  0.003 175
DCP13     .600    0.408    0.169  29  0.062   9  0.012 201  0.007 356  0.007 293  0.011 261  0.012 185  0.016 112  0.005  74
DCP14     .701    0.368    0.091  52  0.039   9  0.016 153  0.012 344  0.006 207  0.002 353  0.006 180  0.012 103  0.003 347
DCP15     .800    0.182    0.080  42  0.032 332  0.007 224  0.005 284  0.003 147  0.001  92  0.003 180  0.010  90  0.007   6
DCP16     .900   -0.053    0.080  14  0.029 262  0.001 146  0.008 285  0.003 289  0.005 216  0.005  99  0.011  99  0.005 273
DCP17     .969   -0.068    0.018   5  0.017 260  0.002 268  0.002 329  0.002  30  0.002 276  0.006 169  0.011 120  0.002  42

                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K           MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        23.26       0.060      0.599      4.96       0.0         9.80     12059.5       20

               V          Q          RN          CN(MIN)    CN(MAX)    ALPHA.NMAX  AERO DAMP  TDR         EXT DAMP
                196.8      68210.     0.62E 07   -0.093      1.125        9.40     -0.00102    1.598       0.0
               (645.8)    (1424.6)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0    RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             9.803    4.964   0  0.247  11  0.097 308  0.057 162  0.043  74  0.118 130  0.163 235  0.159 222  0.035  65
CN                0.859    0.138  61  0.108  58  0.031 106  0.039  97  0.004 319  0.017  74  0.015 223  0.040 237  0.012  81
CM               -0.016    0.044 199  0.019 106  0.007 198  0.007 212  0.005 106  0.006 180  0.009  60  0.017  52  0.006 212

DCP 1     .010    3.190    0.285 358  0.466  70  0.083 108  0.039 118  0.024  30  0.006 323  0.015   7  0.07[illegible] 342  0.015 340
DCP 2     .020    3.018    0.405 358  0.474  77  0.111 109  0.032 112  0.044 104  0.013 133  0.013  14  0.023  16  0.008 325
DCP 3     .030    2.829    0.279 357  0.517  78  0.080  93  0.050  97  0.038  89  0.014 197  0.003  82  0.016  14  0.007 225
DCP 4     .049    2.454    0.350 183  0.519  85  0.092 154  0.131 109  0.067  99  0.026 133  0.043  84  0.021 345  0.018 158
DCP 5     .074    2.331    0.506 174  0.394  80  0.152 162  0.089 108  0.061 131  0.018 155  0.034 111  0.004 234  0.015 147
DCP 6     .099    2.235    0.636 165  0.263  73  0.214 156  0.041 136  0.060 151  0.009 148  0.024 119  0.008 241  0.005 180
DCP 7     .149    1.761    0.403 135  0.329  73  0.280 146  0.111 199  0.037 267  0.005 226  0.008  14  0.011 327  0.014 256
DCP 8     .200    1.327    0.262  72  0.324  72  0.115 131  0.071  87  0.070 133  0.022 177  0.016 129  0.001  65  0.005 204
DCP 9     .250    1.140    0.266  58  0.262  74  0.092   8  0.160 109  0.024  14  0.127 101  0.017 231  0.028 110  0.057 199
DCP10     .300    1.011    0.288  53  0.214  60  0.113   2  0.082  93  0.030   0  0.081  95  0.024 124  0.025 243  0.087 157
DCP11     .399    0.822    0.237  51  0.110  27  0.040 328  0.070 121  0.032 338  0.056 136  0.016  94  0.058 248  0.051  80
DCP12     .501    0.652    0.258  41  0.069 344  0.034  39  0.030  84  0.028 323  0.032  85  0.020 284  0.056 248  0.018  60
DCP13     .600    0.512    0.178  39  0.055 316  0.005 154  0.033  81  0.019 349  0.040 332  0.029 228  0.063 256  0.026  58
DCP14     .701    0.456    0.149  30  0.067 273  0.032 101  0.021  11  0.018 257  0.048 353  0.071 240  0.055 202  0.048   5
DCP15     .800    0.260    0.138  27  0.046 313  0.025  47  0.032  15  0.025 266  0.019 316  0.036 226  0.069 238  0.020 344
DCP16     .900    0.033    0.166 356  0.024 289  0.034  80  0.038  37  0.011 243  0.020 348  0.035 249  0.085 222  0.022  40
DCP17     .969   -0.037    0.052 333  0.018 342  0.010  20  0.029   9  0.017 193  0.033  16  0.005 226  0.067 241  0.014  62
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         23.21      0.060       0.599      4.94        0.0        12.31      12059.6      23

             V           Q           RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP   TOR         EXT DAMP
              196.8       68201.     0.62E 07   -0.099      1.097      11.42      -0.00122     1.914       0.0
             (645.6)     (1424.4)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           12.306   4.937   0   0.224  10   0.048 244   0.012 203   0.027  47   0.019  46   0.033 221   0.032 189   0.014   3
CN               0.926   0.156  91   0.022  21   0.024 157   0.006 289   0.007 248   0.002 149   0.004 164   0.002 210   0.003  64
CM              -0.030   0.067 193   0.003 152   0.007 158   0.002 236   0.001  21   0.001 264   0.002 296   0.002  53   0.001 198

DCP 1    .010    3.405   0.158 143   0.154  75   0.096 159   0.015  77   0.029 154   0.006 247   0.023 154   0.008  98   0.006 109
DCP 2    .020    3.307   0.129 159   0.211  97   0.102 155   0.038 127   0.004   7   0.020 222   0.015 195   0.011 199   0.002 193
DCP 3    .030    3.082   0.236 172   0.234  93   0.117 170   0.050 126   0.011 227   0.011 164   0.006 248   0.001  12   0.006  34
DCP 4    .049    2.419   0.902 169   0.164  53   0.247 183   0.029 285   0.083 228   0.007 212   0.037 249   0.008  63   0.015 300
DCP 5    .074    2.241   0.898 165   0.088 339   0.154 177   0.070 290   0.031 282   0.007 333   0.010  33   0.017  94   0.009  39
DCP 6    .099    2.087   0.870 160   0.166 283   0.054 165   0.056 288   0.034 356   0.015  87   0.015 120   0.016 105   0.024 146
DCP 7    .149    1.755   0.659 145   0.151 262   0.013  99   0.036 349   0.044  87   0.032 183   0.012 255   0.005 185   0.007 258
DCP 8    .200    1.485   0.396 126   0.013 102   0.095 158   0.037 266   0.006 314   0.007 301   0.005  29   0.002  70   0.005 114
DCP 9    .250    1.335   0.299 106   0.070  67   0.116 139   0.053 231   0.036 308   0.017 344   0.011 290   0.005  54   0.006 107
DCP10    .300    1.131   0.242  77   0.095  56   0.094 135   0.034 218   0.025 274   0.011 355   0.007 254   0.005 314   0.007  49
DCP11    .399    0.930   0.230  52   0.077  61   0.026 109   0.005  65   0.020 242   0.014 225   0.015 212   0.007 239   0.003 128
DCP12    .501    0.730   0.258  42   0.046  34   0.009 328   0.011  46   0.015 208   0.006  95   0.010 349   0.004  78   0.012  87
DCP13    .600    0.583   0.248  34   0.024 336   0.025 319   0.003  62   0.010 184   0.012 114   0.012  85   0.008 268   0.008  63
DCP14    .701    0.493   0.219  25   0.037 276   0.032 316   0.014  17   0.002 251   0.005  10   0.008 108   0.004 219   0.004  74
DCP15    .800    0.324   0.228  15   0.022 253   0.023 344   0.007  35   0.003 286   0.006 145   0.007 109   0.008 239   0.012 349
DCP16    .900    0.079   0.108   5   0.013  18   0.011 299   0.007  60   0.007 170   0.002  20   0.006 133   0.005 192   0.003 275
DCP17    .969   -0.019   0.081   3   0.010  16   0.003 256   0.006  47   0.004 115   0.002  25   0.001 159   0.010 210   0.006 333

                         FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0     TEST POINT  CYCLES ANALYSED
              0.0         23.28      0.061       0.597      4.97        0.0        14.84      12059.7      20

             V           Q           RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP   TOR         EXT DAMP
              195.8       67832.     0.62E 07   -0.112      1.136      14.81      -0.00189     2.953       0.0
             (642.3)     (1416.7)
                                                                 HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA           14.843   4.971   0   0.217   4   0.047 261   0.017 188   0.024  60   0.009 317   0.032 262   0.034 148   0.011   0
CN               0.960   0.164  82   0.017 332   0.020  98   0.003 244   0.013  60   0.007 145   0.002 205   0.010 178   0.008 333
CM              -0.056   0.060 232   0.015 245   0.004 282   0.003 266   0.003 249   0.002 270   0.002 344   0.002 339   0.002 194

DCP 1    .010    3.380   0.411 168   0.021 212   0.091 166   0.040 253   0.009 300   0.031 289   0.017 295   0.004 334   0.003 278
DCP 2    .020    3.253   0.383 171   0.021 236   0.101 174   0.025 300   0.015 351   0.034 344   0.014  22   0.007  12   0.004 224
DCP 3    .030    2.780   0.509 174   0.178 267   0.067 261   0.059 320   0.017 298   0.033 359   0.034 119   0.018 222   0.007 156
DCP 4    .049    2.282   0.768 163   0.240 279   0.006 134   0.071 317   0.041  71   0.001 175   0.030  54   0.014 188   0.008 242
DCP 5    .074    2.053   0.583 154   0.194 281   0.034  52   0.019 309   0.029  79   0.007 199   0.014  39   0.016 156   0.008 289
DCP 6    .099    1.904   0.451 144   0.128 278   0.029  62   0.015 250   0.032  34   0.013 150   0.021 347   0.026 122   0.009 287
DCP 7    .149    1.680   0.339 122   0.095 257   0.021  33   0.020 259   0.026  15   0.006 158   0.017 323   0.023 109   0.004 322
DCP 8    .200    1.487   0.286 112   0.089 245   0.015  38   0.014 263   0.009  48   0.008 207   0.007 342   0.006 106   0.009 281
DCP 9    .250    1.317   0.251 104   0.104 246   0.049  87   0.025 228   0.006 350   0.027 222   0.014 338   0.017 191   0.008 271
DCP10    .300    1.171   0.229  94   0.052 244   0.041  95   0.023 221   0.025  64   0.024 156   0.010 201   0.024 219   0.025 308
DCP11    .399    1.011   0.203  73   0.015 281   0.035  94   0.027 235   0.002 220   0.018 199   0.023 267   0.021 260   0.017  13
DCP12    .501    0.824   0.231  53   0.026  56   0.033 112   0.016 215   0.011  88   0.024 166   0.009 211   0.027 232   0.024 305
DCP13    .600    0.682   0.246  40   0.069  55   0.022 117   0.019 114   0.021 107   0.021 128   0.009 186   0.008 162   0.014 359
DCP14    .701    0.590   0.253  30   0.071  64   0.019  88   0.030  61   0.023  91   0.010  49   0.015 146   0.018 127   0.005  44
DCP15    .800    0.417   0.240  21   0.050  67   0.011 123   0.021  91   0.016  26   0.013  34   0.008  97   0.017 131   0.004   3
DCP16    .900    0.157   0.163  22   0.040  42   0.006 113   0.013  27   0.017  43   0.013  65   0.010 156   0.012 100   0.008  95
DCP17    .969    0.010   0.041  27   0.017  28   0.012  78   0.007 350   0.007 334   0.008  43   0.009 129   0.014 188   0.008  38
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                            FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT CYCLES ANALYSED
                   0.0       23.23     0.060       0.597      5.02       0.0        17.35     12059.0      20

                 V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR        EXT DAMP
                  195.5      67061.    0.62E 07   -0.130      1.095      21.37     -0.00229    3.579      0.0
                 (641.5)    (1417.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             17.349   5.018   0  0.210   6  0.042 278  0.014 188  0.036  31  0.022  57  0.019 226  0.029 223  0.012 317
CN                 0.947   0.155  62  0.013 216  0.009 283  0.003 118  0.006 254  0.001  70  0.001 352  0.003  46  0.002 306
CM                -0.083   0.046 218  0.008 254  0.003  32  0.001 267  0.002  31  0.001 152  0.001 196  0.001  82  0.001 103

DCP 1     .010     3.259   0.150 172  0.035 337  0.045   3  0.004 237  0.020  25  0.035 204  0.004 346  0.021  75  0.004   8
DCP 2     .020     3.123   0.209 166  0.066  11  0.041 347  0.006  21  0.010 330  0.030 221  0.014 275  0.030  88  0.004 107
DCP 3     .030     2.907   0.335 160  0.031 268  0.037 328  0.009  88  0.024 307  0.010 259  0.001  14  0.018 150  0.004 303
DCP 4     .049     1.867   0.290 139  0.143 257  0.041 347  0.003 342  0.009 352  0.018  65  0.009  98  0.031  73  0.013  96
DCP 5     .074     1.709   0.208 123  0.100 254  0.024 339  0.012 315  0.008 348  0.015  67  0.011 217  0.023  62  0.004 128
DCP 6     .099     1.606   0.166 105  0.073 257  0.010 342  0.005 271  0.009 308  0.010 126  0.007 202  0.031  68  0.006 182
DCP 7     .149     1.439   0.153  77  0.040 247  0.010 352  0.010 110  0.007 245  0.006  81  0.005 165  0.021  68  0.002 219
DCP 8     .200     1.328   0.147  71  0.042 228  0.011 291  0.007 183  0.010 283  0.006  86  0.004 169  0.019  83  0.013 268
DCP 9     .250     1.229   0.176  72  0.086 231  0.032 307  0.004  49  0.005 243  0.005 183  0.007 267  0.008 289  0.007  40
DCP10     .300     1.127   0.175  67  0.069 219  0.019 290  0.002  55  0.005 287  0.002 177  0.004 259  0.013 299  0.011  20
DCP11     .399     1.028   0.191  62  0.050 207  0.018 260  0.010 208  0.008 233  0.012 169  0.004 249  0.010 236  0.011 303
DCP12     .501     0.879   0.200  52  0.019 197  0.008 273  0.007 180  0.016 294  0.010  13  0.001  25  0.011 296  0.007 329
DCP13     .600     0.764   0.217  50  0.025 112  0.010 210  0.010 180  0.015 285  0.013  20  0.011  46  0.003 290  0.006 231
DCP14     .701     0.685   0.212  43  0.043  75  0.008 162  0.014 106  0.010 199  0.003 309  0.007  20  0.005   4  0.004 178
DCP15     .800     0.520   0.193  31  0.049  53  0.014 228  0.012  36  0.009 172  0.003 261  0.004  36  0.005 114  0.004 336
DCP16     .900     0.241   0.147  44  0.035  57  0.009 237  0.007  44  0.011 179  0.004 282  0.005 336  0.002  95  0.003 242
DCP17     .969     0.055   0.072  57  0.018  42  0.005 197  0.006  57  0.009 213  0.000  73  0.002 214  0.005 202  0.000 100
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                            FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1

                 TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT CYCLES ANALYSED
                   0.0       23.11     0.060       0.597      5.19       0.0         2.52     12061.2      20

                 V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR        EXT DAMP
                  197.3      34316.    0.31E 07   -0.031      0.932       7.72     -0.00100    1.566      0.0
                 (647.2)    (716.7)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              2.517   5.194   0  0.202  11  0.063 288  0.023 167  0.038 353  0.014  46  0.019 189  0.012 293  0.008   6
CN                 0.394   0.561 354  0.036   4  0.014 282  0.008 167  0.004  59  0.001 170  0.002 290  0.010 318  0.003  40
CM                -0.004   0.025 329  0.004 254  0.001 114  0.000 319  0.001 200  0.001  39  0.001 135  0.003 131  0.001 268

DCP 1     .010     0.760   3.124 347  0.250  41  0.037 319  0.038 191  0.030 147  0.022 139  0.008 148  0.006  89  0.018 312
DCP 2     .020     0.689   2.671 350  0.221  41  0.066 149  0.042 197  0.042 248  0.018  51  0.024 291  0.008 290  0.015  22
DCP 3     .030     0.940   2.184 350  0.082 347  0.060 295  0.054  63  0.014 320  0.017  73  0.013 329  0.024 182  0.015 255
DCP 4     .049     1.151   1.965 350  0.079  10  0.074 312  0.029  96  0.032 314  0.023 187  0.008 279  0.014 194  0.005  56
DCP 5     .074     1.231   1.773 350  0.064   1  0.108 321  0.043 216  0.007 332  0.020 213  0.007 175  0.016 199  0.014  90
DCP 6     .099     1.217   1.610 351  0.074 324  0.094 316  0.066 225  0.015 176  0.023 202  0.020 132  0.003 217  0.007  93
DCP 7     .149     0.928   1.276 354  0.151 297  0.049 260  0.106 225  0.139 136  0.065  41  0.028 100  0.067  20  0.035 297
DCP 8     .200     0.658   0.916 355  0.100 293  0.073 181  0.051  86  0.012 358  0.016  56  0.023 291  0.019 200  0.003 227
DCP 9     .250     0.543   0.722 354  0.047 332  0.047 169  0.052  68  0.040 321  0.019 233  0.006 210  0.013 282  0.009  62
DCP10     .300     0.465   0.570 354  0.045  14  0.011 181  0.024  71  0.024 322  0.017 231  0.007 224  0.006 284  0.010  79
DCP11     .399     0.403   0.436 359  0.055  42  0.013 328  0.005  89  0.011 336  0.007 242  0.000 318  0.016 318  0.009  32
DCP12     .501     0.292   0.323   1  0.041  43  0.014 319  0.003 131  0.008 353  0.003 259  0.004 321  0.017 310  0.003  30
DCP13     .600     0.261   0.219   6  0.042  53  0.020 311  0.008 180  0.012  26  0.003 197  0.004 293  0.009 313  0.005  70
DCP14     .701     0.265   0.131   9  0.036  55  0.013 306  0.006 242  0.004  58  0.005 156  0.007 351  0.011 325  0.004 132
DCP15     .800     0.120   0.056  26  0.020  45  0.010 297  0.007 201  0.009  84  0.001 156  0.005 245  0.010 316  0.003 134
DCP16     .900    -0.099   0.018  45  0.012 250  0.010 211  0.006 171  0.002 327  0.001 216  0.003 343  0.019 300  0.005  54
DCP17     .969    -0.075   0.029 171  0.012 236  0.003  30  0.003 165  0.006 105  0.001  69  0.005 328  0.009 330  0.002 116
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                     FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

        TUNED HZ     DRIVE HZ     K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
          0.0         23.09        0.060         0.595       5.11        0.0          7.54      12061.4      20

        V            Q            RN            CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
         196.5        34210.       0.31E 07     -0.057       1.126       10.41      -0.00123     1.926       0.0
        (644.7)      (714.5)                                      HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.543    5.112   0    0.249  19    0.029 272    0.001 117    0.064  38    0.001 305    0.023 132    0.019 155    0.008 223
CN                  0.752    0.247  16    0.146  56    0.033  15    0.022  29    0.021 343    0.017 246    0.007 110    0.001 128    0.001 243
CM                 -0.007    0.028 222    0.024 101    0.005  16    0.004 101    0.004  59    0.004  10    0.002 286    0.001 328    0.001 198

DCP 1     .010      2.993    1.259 350    0.361  62    0.087  33    0.060  31    0.032 328    0.019 240    0.008 135    0.006  70    0.014 100
DCP 2     .020      2.943    1.251 354    0.494  66    0.115  17    0.061  46    0.062 341    0.024 339    0.028 296    0.010 337    0.014 207
DCP 3     .030      2.509    1.137 353    0.386  66    0.113  21    0.051  44    0.079 344    0.026 329    0.038 293    0.011   5    0.010 199
DCP 4     .049      2.217    0.416 336    0.664  84    0.207  38    0.032  49    0.100  24    0.076 329    0.061 260    0.013 352    0.025 280
DCP 5     .074      2.062    0.229 328    0.695  81    0.138  53    0.060  87    0.109  44    0.058 309    0.005 316    0.037   7    0.029 274
DCP 6     .099      1.908    0.137 354    0.676  76    0.093  78    0.120  77    0.080  50    0.020 305    0.018  94    0.030  32    0.012 267
DCP 7     .149      1.504    0.305  18    0.564  72    0.092  20    0.203  55    0.098  87    0.021  13    0.104 108    0.031 145    0.036 119
DCP 8     .200      1.206    0.386  16    0.339  67    0.173 357    0.057  48    0.099 339    0.024 320    0.006  22    0.030  33    0.002  26
DCP 9     .250      1.060    0.399  16    0.262  51    0.144 348    0.035 344    0.097 325    0.052 259    0.025 291    0.025 283    0.023 259
DCP10     .300      0.907    0.347  19    0.177  38    0.091 345    0.030 310    0.064 317    0.049 244    0.011 265    0.024 240    0.017 223
DCP11     .399      0.758    0.311  24    0.119  23    0.029 329    0.025 312    0.034 304    0.043 235    0.008 162    0.018 229    0.007 161
DCP12     .501      0.564    0.250  23    0.072   3    0.008 221    0.008 314    0.019 279    0.024 220    0.014 137    0.005 108    0.001 243
DCP13     .600      0.455    0.199  30    0.061 341    0.017 170    0.010 330    0.010 240    0.017 200    0.014  92    0.005 169    0.009  38
DCP14     .701      0.378    0.131  40    0.050 308    0.032 153    0.009 335    0.005 178    0.012 181    0.011  91    0.004  75    0.005 357
DCP15     .800      0.206    0.129  29    0.053 294    0.014 164    0.009 301    0.011 240    0.015 175    0.010  77    0.004 132    0.005   2
DCP16     .900     -0.034    0.122   9    0.046 284    0.003 163    0.014 309    0.014 249    0.011 186    0.006 116    0.008  93    0.003  16
DCP17     .969     -0.071    0.044  10    0.022 283    0.002 357    0.008 331    0.003 197    0.007 188    0.005 163    0.007 117    0.005   4

                     FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

        TUNED HZ     DRIVE HZ     K             MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
          0.0         23.12        0.060         0.594       4.88        0.0         10.04      12061.5      20

        V            Q            RN            CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
         196.1        34143.       0.31E 07     -0.001       1.078       10.12      -0.00137     2.148       0.0
        (643.4)      (713.1)                                      HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              10.039    4.880   0    0.259   9    0.053 211    0.008  13    0.023  86    0.057  12    0.045 132    0.029 195    0.006  96
CN                  0.849    0.132  58    0.088  61    0.038 136    0.013  66    0.007 150    0.008 340    0.036 164    0.005 192    0.002 210
CM                 -0.016    0.053 200    0.018  99    0.008 173    0.004 106    0.001 210    0.004 123    0.001 359    0.001  30    0.001  56

DCP 1     .010      3.305    0.255 356    0.438  73    0.145 128    0.063  93    0.029  55    0.033  26    0.025 351    0.019 345    0.007 318
DCP 2     .020      2.962    0.412 356    0.445  79    0.135 131    0.073  68    0.052 125    0.014  55    0.005 343    0.007 112    0.003 348
DCP 3     .030      2.835    0.338 354    0.466  83    0.109 111    0.064  84    0.058 121    0.005  73    0.008 238    0.003 131    0.009 289
DCP 4     .049      2.358    0.446 105    0.481  87    0.161 173    0.169 109    0.041 124    0.064 148    0.038  94    0.027 203    0.018 155
DCP 5     .074      2.199    0.601 175    0.350  83    0.199 170    0.127 106    0.036 188    0.051 127    0.004 165    0.017 175    0.012 221
DCP 6     .099      2.060    0.632 166    0.248  80    0.236 164    0.054 113    0.044 204    0.014 143    0.001 220    0.018 227    0.008 298
DCP 7     .149      1.770    0.507 150    0.195  80    0.214 152    0.038 191    0.057 270    0.041  22    0.015 236    0.018 320    0.007 290
DCP 8     .200      1.337    0.197  81    0.346  75    0.169 147    0.073  83    0.045 150    [illegible] 296    0.010 265    0.015 308    0.006   7
DCP 9     .250      1.160    0.238  46    0.232  61    0.048 101    0.072  32    0.028 117    [illegible]  18    0.025 142    0.026 149    0.014 136
DCP10     .300      0.998    0.243  43    0.165  50    0.033  71    0.052  24    0.008  84    0.015   5    0.011 100    0.020 125    0.012  89
DCP11     .399      0.846    0.256  41    0.089  33    0.024  49    0.024   4    0.011 113    0.020 352    0.008 161    0.015 154    0.011  90
DCP12     .501      0.646    0.240  37    0.047   5    0.026  49    0.022 319    0.005 151    0.014 324    0.011 133    0.006  28    0.005 251
DCP13     .600      0.530    0.229  35    0.044 323    0.023   9    0.021 259    0.003 149    0.015 311    0.008 179    0.005 215    0.008 231
DCP14     .701      0.436    0.178  32    0.058 273    0.008  35    0.010 227    0.003  77    0.016 299    0.012 197    0.008 240    0.009 229
DCP15     .800      0.263    0.181  23    0.049 275    0.008   6    0.005 283    0.002 265    0.012 304    0.006 230    0.010 216    0.007 255
DCP16     .900      0.014    0.161   8    0.032 276    0.012   4    0.006 285    0.011  39    0.011 284    0.002 127    0.006 213    0.004 254
DCP17     .969     -0.050    0.064   7    0.011 263    0.009 349    0.004 204    0.004  11    0.008 283    0.004 131    0.004 260    0.003 243
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                            FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H         ALPHA.O       TEST POINT  CYCLES ANALYSED
                  0.0        23.05        0.060         0.594       5.03        0.0           11.94       12061.6       20

                V           Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP     TDR         EXT DAMP
                 195.9        34057.      0.31E 07    -0.106        1.135       11.49       -0.00151        2.359       0.0
                (642.7)     (711.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             11.941    5.031   0   0.207   9   0.047 218   0.006 192   0.015   0   0.010 358   0.010 144   0.015 156   0.006 311
CN                 0.908    0.145  85   0.033  76   0.042 142   0.008 262   0.018 137   0.007 207   0.010 103   0.001  96   0.003  78
CM                -0.032    0.066 196   0.005 216   0.008 185   0.001 193   0.002 277   0.002 341   0.003 231   0.003 271   0.001 172

DCP 1    .010      3.564    0.116 141   0.188  83   0.133 149   0.038 186   0.030 138   0.014 211   0.021 141   0.006 193   0.012 166
DCP 2    .020      3.117    0.037 126   0.219  90   0.121 161   0.034 180   0.034 186   0.016 215   0.011 171   0.013 246   0.002 205
DCP 3    .030      2.942    0.131 167   0.265  91   0.103 163   0.035 160   0.029 212   0.021 188   0.002 182   0.011 255   0.004 285
DCP 4    .049      2.349    0.742 176   0.101  86   0.237 177   0.029 231   0.079 172   0.033 276   0.042 153   0.035 309   0.021 206
DCP 5    .074      2.146    0.765 169   0.008 330   0.200 176   0.038 263   0.053 158   0.028 255   0.017 160   0.019 291   0.002 126
DCP 6    .099      1.986    0.701 163   0.066 262   0.144 170   0.031 274   0.029 156   0.014 298   0.022 119   0.011 229   0.001 236
DCP 7    .149      1.695    0.524 148   0.038 242   0.112 151   0.026 278   0.025  87   0.024 188   0.012 204   0.012 299   0.007  42
DCP 8    .200      1.435    0.365 132   0.064  92   0.127 152   0.017 234   0.030 135   0.011 225   0.009 163   0.006 308   0.009 126
DCP 9    .250      1.290    0.298 118   0.049 111   0.115 150   0.031 258   0.027 165   0.006 298   0.015 149   0.016 258   0.007  61
DCP10    .300      1.109    0.231  91   0.069  91   0.089 138   0.013 237   0.021 172   0.007 332   0.018 149   0.009 279   0.015 108
DCP11    .399      0.933    0.268  61   0.068  75   0.065 126   0.005 232   0.029 133   0.006 182   0.016 108   0.011 112   0.016 107
DCP12    .501      0.731    0.259  43   0.050  66   0.039  63   0.010 324   0.021 109   0.012 219   0.017  97   0.006 204   0.010  63
DCP13    .600      0.585    0.262  34   0.022  26   0.027  41   0.009 351   0.020  97   0.006 236   0.009  60   0.007 117   0.007  37
DCP14    .701      0.489    0.247  26   0.017  16   0.032 354   0.011 355   0.011 121   0.014 178   0.017  56   0.013  96   0.006 330
DCP15    .800      0.330    0.236  15   0.009  36   0.025 350   0.004 219   0.006 137   0.009 146   0.016  47   0.016  65   0.012 317
DCP16    .900      0.082    0.189   7   0.023  45   0.014 332   0.008 157   0.008  99   0.012 149   0.011  41   0.007  70   0.006 237
DCP17    .969     -0.020    0.077   5   0.016  64   0.002  29   0.006 317   0.003 179   0.008 176   0.003  23   0.006 116   0.002 236

                            FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H         ALPHA.O       TEST POINT  CYCLES ANALYSED
                  0.0        23.09        0.060         0.594       5.01        0.0           14.87       12061.7       20

                V           Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP     TDR         EXT DAMP
                 196.0        34076.      0.31E 07    -0.115        1.093       12.17       -0.00183        2.855       0.0
                (643.0)     (711.7)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             14.868    5.008   0   0.197   2   0.038 267   0.017 221   0.039  42   0.023  94   0.026 227   0.006 320   0.006  36
CN                 0.946    0.146  85   0.022 242   0.009 106   0.015 176   0.006 283   0.006 345   0.003 252   0.008   2   0.003 226
CM                -0.057    0.057 203   0.015 253   0.001 276   0.003 289   0.003  61   0.003 144   0.001  50   0.003 176   0.001  41

DCP 1    .010      3.609    0.333 160   0.080 275   0.050 181   0.003 245   0.011 338   0.001 155   0.010 325   0.009 219   0.008 107
DCP 2    .020      3.139    0.338 165   0.059 299   0.043 200   0.016 252   0.008 353   0.003 156   0.004 207   0.012 208   0.007 167
DCP 3    .030      2.934    0.398 170   0.059 312   0.085 196   0.010 262   0.016 171   0.008  68   0.005 207   0.014 287   0.006  90
DCP 4    .049      2.178    0.683 167   0.275 274   0.067 103   0.063 253   0.048  46   0.021 180   0.011 334   0.008 140   0.016 240
DCP 5    .074      1.967    0.552 162   0.246 267   0.041  88   0.065 228   0.028  44   0.012 186   0.009 342   0.008 118   0.012 259
DCP 6    .099      1.791    0.428 152   0.204 257   0.028  72   0.038 217   0.016  38   0.002 213   0.006   7   0.005 127   0.011 187
DCP 7    .149      1.598    0.335 139   0.174 265   0.012  26   0.038 186   0.012  65   0.017 123   0.010 199   0.015 265   0.008 297
DCP 8    .200      1.436    0.277 132   0.132 244   0.007  88   0.026 200   0.008  97   0.011 129   0.006 267   0.007 235   0.005 320
DCP 9    .250      1.331    0.235 109   0.111 229   0.015 305   0.028 179   0.018 310   0.010  47   0.005 281   0.020  25   0.005 140
DCP10    .300      1.171    0.213  90   0.068 207   0.006 315   0.030 170   0.023 277   0.018   4   0.006  56   0.013  23   0.010  91
DCP11    .399      1.000    0.216  72   0.028 159   0.019  71   0.021 152   0.021 297   0.016  17   0.010 276   0.023  37   0.002 276
DCP12    .501      0.812    0.227  55   0.033 113   0.012 112   0.017 157   0.019 261   0.011 355   0.008 209   0.012 357   0.001  96
DCP13    .600      0.687    0.237  43   0.060  80   0.017 111   0.013 146   0.010 237   0.011 321   0.006 226   0.013  10   0.010 250
DCP14    .701      0.579    0.228  28   0.063  70   0.011 130   0.016 115   0.008 223   0.017 319   0.006 292   0.013 348   0.006 282
DCP15    .800      0.431    0.215  21   0.050  57   0.006 136   0.011 113   0.006 249   0.010 307   0.004 202   0.011 321   0.006 180
DCP16    .900      0.159    0.152  17   0.039  41   0.002 296   0.006  71   0.007 205   0.012 326   0.001 121   0.006 350   0.007 199
DCP17    .969      0.007    0.063  22   0.019  35   0.003   9   0.004 124   0.006 233   0.008 290   0.003 316   0.006 350   0.005 232
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                      FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

         TUNED HZ     DRIVE HZ     K             MACH NO       DEL.ALPHA     DEL.H          ALPHA.O        TEST POINT    CYCLES ANALYSED
          0.0          45.83        0.119         0.592          5.18          0.0            12.54         12067.1        20

         V            Q            RN            CN(MIN)       CN(MAX)       ALPHA.NMAX     AERO DAMP      TDR           EXT DAMP
          195.5        101037.      0.93E 07     -0.116          1.410         12.66         -0.00140        2.220         0.0
         (641.4)      (2110.2)
                                                                   HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              12.542     5.185   0    0.275   3    0.195 185    0.083  52    0.053  18    0.028  62    0.029 198    0.011 115    0.012  42
CN                  0.997     0.284  79    0.055  97    0.048 101    0.019 126    0.006  85    0.007 123    0.003 125    0.006  56    0.005 346
CM                 -0.028     0.075 209    0.005 196    0.017 181    0.008 207    0.004 184    0.004 222    0.001 199    0.003 215    0.002 157

DCP 1     .010      3.441     0.254 152    0.219  88    0.167 152    0.084  93    0.039 157    0.024 107    0.039 127    0.025  86    0.030  79
DCP 2     .020      3.220     0.220 159    0.250 102    0.180 168    0.098 121    0.042 192    0.040 157    0.038 179    0.042 166    0.033 145
DCP 3     .030      3.209     0.176 111    0.264  85    0.143 155    0.094  96    0.020 160    0.029  92    0.014 139    0.010  42    0.010 188
DCP 4     .049      2.783     0.531 154    0.176  79    0.244 162    0.035 137    0.084 170    0.018 206    0.047 181    0.017 222    0.030 176
DCP 5     .074      2.596     0.637 147    0.084  57    0.249 153    0.069 225    0.071 152    0.056 237    0.025 186    0.031 232    0.018 264
DCP 6     .099      2.370     0.897 152    0.020 179    0.245 143    0.122 215    0.033 116    0.070 226    0.016 236    0.012 197    0.021 297
DCP 7     .149      2.018     0.857 135    0.199 198    0.082 113    0.075 189    0.016 309    0.021 291    0.016 340    0.019  34    0.012   8
DCP 8     .200      1.553     0.540 105    0.191 129    0.144 149    0.067 206    0.012 270    0.009 158    0.006  85    0.002 129    0.004 269
DCP 9     .250      1.388     0.453  79    0.173  87    0.145 115    0.064 168    0.012  90    0.028 126    0.005  57    0.012  77    0.015 169
DCP10     .300      1.195     0.441  67    0.168  92    0.125 110    0.071 154    0.015 192    0.023 211    0.020 246    0.021 308    0.012  33
DCP11     .399      0.985     0.425  58    0.088  75    0.076  67    0.058 110    0.032  99    0.040 143    0.019 131    0.019 142    0.004  71
DCP12     .501      0.782     0.382  48    0.038  78    0.051  34    0.045  88    0.016  58    0.035 117    0.023  82    0.014 102    0.009  12
DCP13     .600      0.632     0.354  47    0.012  53    0.051  23    0.038  52    0.017   5    0.023  79    0.016  97    0.019  50    0.009  25
DCP14     .701      0.527     0.284  45    0.012 237    0.059 359    0.030  19    0.012 340    0.027  35    0.014 328    0.009  65    0.014 353
DCP15     .800      0.333     0.259  36    0.013   6    0.058 357    0.032  14    0.021   4    0.020 345    0.008 359    0.014   8    0.010 338
DCP16     .900      0.053     0.199  25    0.036  26    0.044 357    0.030 354    0.010 333    0.018  12    0.009 268    0.015  22    0.012 293
DCP17     .969     -0.023     0.081  27    0.023  59    0.022  28    0.021 357    0.003  52    0.010 352    0.003 223    0.012   2    0.010 281
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K         MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0        45.88      0.121     0.587      5.15        0.0        15.09     12067.2      20

               V          Q          RN        CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                193.6      99778.     0.92E 07 -0.116      1.297       13.20     -0.00167    2.618       0.0
               (635.3)    (2083.9)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.092   5.153   0   0.237   1   0.051 277   0.074 120   0.004  82   0.015  35   0.019 221   0.008  96   0.001 205
CN                1.041   0.256  78   0.034 186   0.013 186   0.007 217   0.005 239   0.001 352   0.003 317   0.003 256   0.002  98
CM               -0.042   0.077 213   0.012 250   0.004 341   0.003 282   0.002 335   0.000  28   0.002  90   0.002  96   0.001 304

DCP 1   .010      3.488   0.520 142   0.103  55   0.125 159   0.036 228   0.046 120   0.024 218   0.011 105   0.024 224   0.015 175
DCP 2   .020      3.373   0.468 148   0.075  76   0.130 175   0.053 248   0.048 171   0.026 266   0.007  81   0.024 266   0.005 238
DCP 3   .030      3.031   0.622 171   0.037  96   0.134 191   0.048 270   0.006 174   0.019 349   0.009  58   0.020  62   0.009 213
DCP 4   .049      2.743   0.634 155   0.244 268   0.068 155   0.121 282   0.344 336   0.010 264   0.032  42   0.010 163   0.019  68
DCP 5   .074      2.543   0.593 147   0.295 256   0.044  10   0.052 259   0.047 339   0.030  82   0.012 102   0.009 140   0.012 191
DCP 6   .099      2.346   0.581 144   0.279 238   0.079 345   0.007 176   0.011 319   0.034  34   0.024 136   0.011 223   0.007 338
DCP 7   .149      1.945   0.385 119   0.145 206   0.027   1   0.016 165   0.029 309   0.015 125   0.009 351   0.031 177   0.016  15
DCP 8   .200      1.606   0.336 113   0.110 203   0.026 291   0.020 198   0.021 278   0.009 350   0.003  77   0.012 168   0.010 295
DCP 9   .250      1.467   0.344  95   0.128 187   0.021 275   0.009 141   0.017 230   0.012  20   0.005 352   0.010 337   0.014  44
DCP10   .300      1.300   0.338  81   0.092 168   0.031 228   0.012 281   0.019 267   0.010 276   0.008 332   0.007  19   0.002 316
DCP11   .399      1.097   0.384  69   0.069 151   0.017 203   0.015 226   0.021 196   0.005 204   0.006 138   0.015  56   0.010 342
DCP12   .501      0.865   0.377  55   0.054 115   0.031 168   0.007 193   0.010 191   0.010 286   0.011 307   0.001  58   0.014 163
DCP13   .600      0.683   0.356  47   0.045  96   0.025 161   0.018 175   0.005  84   0.005 350   0.021 330   0.019 334   0.008 181
DCP14   .701      0.555   0.308  39   0.026  77   0.010 181   0.011  73   0.013 147   0.011 189   0.011 261   0.016 278   0.011 147
DCP15   .800      0.383   0.295  34   0.038  50   0.014 161   0.013  87   0.001 294   0.005 184   0.006 255   0.011 233   0.007  86
DCP16   .900      0.104   0.207  37   0.036  31   0.016 142   0.007 107   0.007 166   0.007  62   0.007 189   0.014 226   0.005  42
DCP17   .969     -0.008   0.090  50   0.022  27   0.013 141   0.004  35   0.006  48   0.004   2   0.005 159   0.003 196   0.004  86
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K         MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0        45.87      0.122     0.583      5.18        0.0        17.53     12067.3      20

               V          Q          RN        CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                191.9      98427.     0.92E 07 -0.148      1.329       17.60     -0.00184    2.861       0.0
               (629.5)    (2055.7)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.528   5.182   0   0.246   5   0.056 292   0.074 110   0.010  94   0.024  54   0.023 203   0.016 136   0.003   1
CN                1.043   0.288  73   0.017 186   0.001  82   0.010 160   0.002 223   0.004  66   0.003 148   0.001 317   0.006 131
CM               -0.074   0.075 218   0.009 235   0.004 327   0.002 297   0.001 264   0.002 224   0.000 248   0.001 217   0.001 310

DCP 1   .010      2.922   0.829 151   0.178 243   0.044  80   0.055 241   0.031 304   0.021 143   0.013 227   0.010 103   0.011  35
DCP 2   .020      2.837   0.721 150   0.177 247   0.043 340   0.067 242   0.023 319   0.022 176   0.021 301   0.004 286   0.010  72
DCP 3   .030      3.041   0.639 154   0.126 299   0.019 146   0.001 170   0.028  15   0.033 148   0.006 185   0.022 201   0.022 160
DCP 4   .049      2.374   0.506 129   0.162 257   0.100  17   0.024 109   0.016 285   0.004   3   0.022 195   0.013   4   0.028  86
DCP 5   .074      2.154   0.419 121   0.093 244   0.050  10   0.035 128   0.014 225   0.018 346   0.008  28   0.014 346   0.017  83
DCP 6   .099      2.008   0.397 115   0.080 233   0.031  15   0.013 150   0.029 212   0.015 298   0.012 116   0.025 267   0.017 135
DCP 7   .149      1.794   0.380  99   0.092 199   0.037 327   0.018 131   0.007 145   0.004 289   0.014 146   0.013 291   0.010  59
DCP 8   .200      1.549   0.349  96   0.085 188   0.021 304   0.014 230   0.002 353   0.020 159   0.002  46   0.023 156   0.002 314
DCP 9   .250      1.448   0.320  82   0.069 175   0.029 260   0.012 181   0.006 130   0.004 103   0.025 153   0.008 233   0.010 247
DCP10   .300      1.307   0.334  73   0.044 170   0.011 281   0.012 179   0.006 348   0.008 150   0.004 116   0.003  84   0.011 138
DCP11   .399      1.145   0.374  68   0.044 158   0.025 203   0.017 232   0.011 213   0.005 138   0.005 231   0.002 135   0.011 242
DCP12   .501      0.949   0.372  56   0.030 170   0.014 183   0.015 201   0.017 251   0.009   9   0.006 258   0.003 351   0.005 191
DCP13   .600      0.786   0.367  51   0.027  89   0.012 147   0.009 146   0.001 306   0.007  92   0.005 113   0.006   0   0.009 124
DCP14   .701      0.670   0.340  45   0.032  55   0.018 121   0.015 143   0.002 335   0.010  24   0.002 245   0.006 358   0.009 117
DCP15   .800      0.497   0.310  41   0.033  36   0.011 119   0.018  98   0.015  88   0.013  44   0.010  65   0.010  90   0.013 127
DCP16   .900      0.176   0.226  44   0.027   9   0.014  99   0.013  85   0.006  68   0.011  42   0.003  92   0.004 293   0.005  63
DCP17   .969      0.017   0.101  56   0.018 359   0.010 137   0.008 106   0.010  78   0.003  74   0.001 248   0.002 319   0.002  97
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ  K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0      45.78     0.119      0.591      5.27       0.0         9.96     12065.1      20

               V          Q         RN         CN(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
                195.3     100774.    0.93E 07  -0.118      1.469      12.50     -0.00133    2.950       0.0
               (640.8)   (2104.7)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             9.960   5.272   0  0.283  23  0.135 116  0.224 269  0.030 309  0.009 359  0.024 177  0.008 224  0.014  51
CN                0.910   0.302  58  0.149  44  0.051  35  0.034 353  0.014 332  0.012 311  0.006 224  0.003 233  0.006  89
CM               -0.014   0.055 222  0.025 113  0.013 145  0.011  87  0.006  79  0.006  34  0.004   5  0.002 347  0.003 292

DCP 1     .010    3.155   0.383 357  0.525  69  0.098  61  0.017  50  0.032   2  0.031 329  0.038 292  0.014 327  0.012 257
DCP 2     .020    2.989   0.431   7  0.592  76  0.096  44  0.071  60  0.041  48  0.025 311  0.044 333  0.043 251  0.025 273
DCP 3     .030    2.967   0.561   1  0.534  78  0.127  34  0.069  43  0.047  51  0.038 292  0.019 330  0.036 253  0.031 249
DCP 4     .049    2.598   0.760 129  0.595  66  0.031  73  0.172  58  0.040  20  0.060  43  0.040  13  0.023 342  0.041 305
DCP 5     .074    2.479   0.419 135  0.536  60  0.075 128  0.171  50  0.021  79  0.088  29  0.019   8  0.032  26  0.031 332
DCP 6     .099    2.413   0.586 139  0.481  59  0.171 120  0.146  37  0.029  64  0.073  23  0.033  42  0.036  17  0.025 331
DCP 7     .149    1.854   0.574  83  0.536  70  0.292 125  0.034 133  0.018  83  0.028 135  0.011 303  0.033  65  0.011  56
DCP 8     .200    1.441   0.593  62  0.387  71  0.191  67  0.139  67  0.064 132  0.050  85  0.040 179  0.026 170  0.024 160
DCP 9     .250    1.274   0.503  48  0.261  44  0.157  21  0.125   7  0.042   8  0.054 352  0.017  94  0.008 317  0.026  87
DCP10     .300    1.110   0.480  47  0.214  34  0.154  17  0.110 351  0.062 345  0.055 335  0.021 341  0.012 300  0.028  79
DCP11     .399    0.896   0.409  51  0.129  20  0.105   7  0.068 320  0.047 337  0.046 292  0.023 283  0.032 276  0.007 136
DCP12     .501    0.686   0.363  49  0.100 352  0.055 354  0.050 311  0.036 312  0.037 274  0.028 250  0.025 240  0.012 177
DCP13     .600    0.546   0.315  54  0.080 336  0.043 349  0.036 289  0.028 332  0.023 235  0.024 234  0.020 186  0.013 127
DCP14     .701    0.463   0.248  60  0.071 308  0.029 344  0.042 262  0.023 244  0.026 191  0.023 174  0.019 130  0.012  73
DCP15     .800    0.266   0.216  46  0.068 309  0.040 329  0.040 250  0.023 273  0.023 178  0.016 148  0.007  86  0.012 111
DCP16     .900   -0.006   0.163  30  0.065 320  0.046 304  0.028 257  0.021 208  0.020 178  0.018 136  0.007  80  0.012  89
DCP17     .969   -0.054   0.170  30  0.036 333  0.027 325  0.017 292  0.016 253  0.015 233  0.013 169  0.006 121  0.007 146
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ  DRIVE HZ  K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                 0.0      68.87     0.176      0.603      5.95       0.0         0.02     12069.1      20

               V          Q         RN         CN(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
                199.0     103905.    0.94E 07  -0.062      0.639       6.35     -0.00078    1.790       0.0
               (652.9)   (2170.1)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             0.021   5.952   0  0.519 339  0.129 207  0.025 185  0.053  99  0.027  50  0.011 297  0.011 266  0.008 106
CN                0.121   0.515 354  0.028 349  0.009 233  0.005 196  0.006 167  0.003 125  0.001 321  0.001 134  0.001 144
CM               -0.018   0.039 298  0.037 270  0.002  97  0.001 342  0.001  46  0.001 337  0.000 234  0.000 254  0.000 316

DCP 1     .010   -0.807   3.392 336  0.223 246  0.293 258  0.179 304  0.043 318  0.091 288  0.042 316  0.019 260  0.039 264
DCP 2     .020   -0.584   2.636 342  0.131 313  0.134 269  0.113 332  0.083  61  0.035  51  0.047 357  0.054  68  0.017 156
DCP 3     .030   -0.308   2.366 341  0.137 352  0.078 151  0.030 301  0.071  65  0.051 110  0.021 185  0.016  88  0.027 145
DCP 4     .049    0.103   2.145 342  0.114 346  0.111 119  0.052 201  0.025  83  0.027  75  0.031 182  0.008 279  0.007 194
DCP 5     .074    0.229   1.830 342  0.125 306  0.123 111  0.045 158  0.035 193  0.017 347  0.009 176  0.029 190  0.009 306
DCP 6     .099    0.456   1.588 344  0.168 279  0.134 130  0.067  83  0.044 224  0.031 317  0.022 311  0.018 196  0.016  46
DCP 7     .149    0.246   0.959 346  0.094 349  0.026 292  0.030 167  0.032 124  0.009 319  0.013 254  0.001 240  0.002 203
DCP 8     .200    0.196   0.787 355  0.051 344  0.021 277  0.015 187  0.012 152  0.005  43  0.004  24  0.003  90  0.000 286
DCP 9     .250    0.189   0.665 352  0.046 340  0.021 247  0.008 193  0.009 139  0.002 113  0.003  53  0.004  51  0.002 350
DCP10     .300    0.194   0.562 354  0.041 348  0.018 244  0.006 202  0.007 147  0.011  38  0.002  24  0.002 116  0.009  67
DCP11     .399    0.168   0.447   8  0.036  14  0.018 271  0.006 229  0.006 212  0.005 135  0.001 128  0.003 192  0.002  74
DCP12     .501    0.131   0.340  14  0.033  29  0.039 268  0.005 228  0.007 198  0.035 124  0.002  39  0.003 185  0.002 168
DCP13     .600    0.146   0.294  22  0.030  43  0.039 258  0.003 233  0.007 228  0.005 146  0.001 149  0.001  95  0.003 183
DCP14     .701    0.227   0.171  79  0.078  56  0.035 243  0.004 109  0.003 216  0.006 143  0.002 349  0.003  59  0.001 182
DCP15     .800    0.097   0.103  53  0.020  82  0.006 224  0.003 211  0.003 256  0.007 174  0.003  29  0.001 111  0.033  78
DCP16     .900   -0.096   0.055 105  0.022 134  0.007 197  0.004 156  0.006 172  0.004 137  0.001 198  0.001  71  0.002 109
DCP17     .965   -0.050   0.046 163  0.010 139  0.006 147  0.001 161  0.002 187  0.003 178  0.034  37  0.002  65  0.004 233
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0         68.87       0.177         0.600        5.99         0.0          2.47        12069.2       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
               197.7        102990.      0.93E 07    -0.043        0.942        8.75        -0.00078      1.263        0.0
              (648.5)      (2151.0)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.468   5.985   0   0.499 347   0.190 180   0.031 163   0.021  96   0.011  64   0.013 228   0.013 131   0.003 252
CN                  0.357   0.517 353   0.038 332   0.013 290   0.003 358   0.004 236   0.001 197   0.002 236   0.002 111   0.002  77
CM                 -0.006   0.039 299   0.008 224   0.003 110   0.001 109   0.001  71   0.003 243   0.000 120   0.000 189   0.000 353

DCP 1    .010       0.576   3.122 333   0.284   7   0.069  90   0.081 158   0.032  96   0.007 208   0.012 118   0.011 210   0.010 279
DCP 2    .020       0.791   2.448 341   0.098 306   0.019 237   0.035 355   0.027  81   0.008  96   0.023 218   0.014 146   0.004 344
DCP 3    .030       0.909   2.174 340   0.086 311   0.027 159   0.023   2   0.006 175   0.008 344   0.021 232   0.015 137   0.006   6
DCP 4    .049       1.164   1.935 340   0.051 329   0.027 270   0.005  27   0.024 254   0.015 152   0.007 222   0.016 110   0.012 345
DCP 5    .074       1.252   1.759 341   0.064 281   0.033 278   0.026 197   0.009 265   0.027 159   0.016  24   0.006 131   0.014 350
DCP 6    .099       1.311   1.698 342   0.146 251   0.019 310   0.077 208   0.033  86   0.031 191   0.038  61   0.014 284   0.015  57
DCP 7    .149       0.965   1.320 346   0.299 357   0.203 145   0.087  39   0.070  13   0.052 310   0.049 212   0.019 106   0.016 148
DCP 8    .200       0.616   0.811 355   0.087 315   0.052 172   0.068  32   0.033 279   0.013 183   0.009 249   0.013 125   0.009 357
DCP 9    .250       0.519   0.663 352   0.058 352   0.010 169   0.029 326   0.034 210   0.022 111   0.015 351   0.003 265   0.004 142
DCP10    .300       0.448   0.507 356   0.083   9   0.028 264   0.012 235   0.015 156   0.006  52   0.007 272   0.005 127   0.003  46
DCP11    .399       0.385   0.421   9   0.067  20   0.023 275   0.005 255   0.005 221   0.002 226   0.003 306   0.001  96   0.003  97
DCP12    .501       0.293   0.323  15   0.049  18   0.017 271   0.004 258   0.005 237   0.003 278   0.001 220   0.003 141   0.002 178
DCP13    .600       0.262   0.246  23   0.041  21   0.012 264   0.001 264   0.007 257   0.001  69   0.001 150   0.001 315   0.004 110
DCP14    .701       0.209   0.162  36   0.040  23   0.013 266   0.001 210   0.004 267   0.004  99   0.002 186   0.003  24   0.003 120
DCP15    .800       0.130   0.100  49   0.023  76   0.008 256   0.003  36   0.002 206   0.002  77   0.001 347   0.003   1   0.003 243
DCP16    .900      -0.101   0.036  73   0.006  39   0.006 323   0.004 306   0.003 257   0.001 340   0.001 218   0.003  98   0.001  36
DCP17    .969      -0.067   0.011 179   0.006 221   0.036 127   0.005 288   0.004   1   0.003 203   0.001  68   0.003 325   0.002 320

                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0         68.88       0.178         0.597        5.90         0.0          4.99        12069.3       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
               196.7        102315.      0.93E 07    -0.039        1.229        11.21       -0.00080      1.286        0.0
              (645.2)      (2136.9)
                                                          HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               4.387   5.902   0   0.656   3   0.263 168   0.042 166   0.023  51   0.026 266   0.023 206   0.024 202   0.008 358
CN                  0.635   0.509   7   0.095 313   0.056 172   0.015  18   0.003 232   0.003 191   0.005  59   0.002 317   0.002 199
CM                 -0.000   0.061 286   0.013  68   0.014 296   0.011 156   0.005  35   0.001 344   0.001 236   0.001  80   0.001 359

DCP 1    .010       1.860   2.419 339   0.268  36   0.023 313   0.050 200   0.011 276   0.029 126   0.006 303   0.009  67   0.013 339
DCP 2    .020       1.766   2.203 346   0.179  27   0.013 226   0.062 211   0.036  69   0.019 208   0.020  98   0.011  29   0.010  16
DCP 3    .030       1.914   2.009 345   0.079   0   0.025 169   0.051 219   0.038  92   0.011 166   0.074  67   0.010 357   0.014  45
DCP 4    .049       1.871   1.619 347   0.255  25   0.128 252   0.099 156   0.097  68   0.068 285   0.026 133   0.024 336   0.007 223
DCP 5    .074       1.828   1.428 350   0.209  19   0.198 257   0.137 141   0.091  17   0.038 268   0.006 281   0.015 257   0.026 142
DCP 6    .099       1.767   1.316 356   0.353  10   0.272 266   0.166 140   0.115 346   0.031 171   0.064 311   0.065 180   0.001  86
DCP 7    .149       1.322   1.167   5   0.395 316   0.202 224   0.091 203   0.089 151   0.060 137   0.056  49   0.021 336   0.013  35
DCP 8    .200       1.332   0.962   8   0.285 306   0.186 195   0.048 126   0.040 126   0.037  60   0.071   7   0.014   1   0.013 287
DCP 9    .250       0.866   0.771   3   0.180 281   0.155 155   0.058  65   0.017  40   0.035 362   0.033 283   0.017 166   0.006  91
DCP10    .300       0.766   0.633   5   0.151 276   0.130 165   0.069  29   0.029 335   0.035 275   0.028 183   0.016  71   0.005 139
DCP11    .399       0.587   0.470  20   0.093 292   0.097 168   0.070  17   0.030 280   0.017 235   0.025 157   0.022  60   0.014 288
DCP12    .501       0.431   0.369  27   0.065 290   0.068 133   0.058 355   0.028 266   0.015 133   0.019  97   0.012 350   0.011 227
DCP13    .600       0.366   0.288  41   0.061 301   0.056 131   0.055 363   0.031 276   0.014 147   0.016  60   0.015 307   0.014 206
DCP14    .701       0.336   0.216  59   0.056 309   0.066 130   0.042 326   0.025 187   0.005  45   0.027  13   0.011 261   0.035 157
DCP15    .800       0.156   0.166  60   0.030 273   0.035 133   0.028 313   0.013 158   0.002 157   0.008  22   0.012 235   0.037 123
DCP16    .900      -0.091   0.066  53   0.030 236   0.032  79   0.018 301   0.008 195   0.002 136   0.006 326   0.010 196   0.036  77
DCP17    .969      -0.080   0.018 147   0.027 268   0.017  88   0.008 305   0.006 265   0.036 141   0.013 358   0.006 260   0.002 121
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0         68.91        0.181        0.593        5.80         0.0          7.48        12069.4       20

          V           Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                                    0.92E 07    -0.137        1.491        13.41       -0.00062      0.988        0.0
           193.9       99806.
          (636.1)     (2084.5)                                      HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.477     5.800   0    0.786  17    0.356 166    0.059 161    0.022  56    0.052 331    0.016 215    0.016 189    0.019 317
CN                  0.779     0.497  28    0.167 332    0.066 221    0.015 165    0.013  51    0.012 280    0.009 189    0.005 106    0.006 345
CM                 -0.011     0.047 237    0.042  75    0.025 324    0.011 268    0.010 196    0.008  98    0.005  10    0.003 278    0.003 189

DCP 1     .010      2.551     1.526 349     .545  63    0.192 301    0.105 196    0.052  76    0.039 350    0.027 301    0.036 265    0.036 176
DCP 2     .020      2.369     1.436   9    0.636  68    0.233 313    0.160 218    0.031  80    0.006 164    0.025   8    0.025 314    0.034 264
DCP 3     .030      2.376     1.345 356    0.743  63    0.237 315    0.154 222    0.014  69    0.075 191    0.014  35    0.023 327    0.042 256
DCP 4     .049      2.288     0.878   4    0.581  39    0.251 291    0.157 207    0.015 295    0.091 173    0.067  61    0.031 306    0.015 230
DCP 5     .074      2.144     0.778  12    0.627  36    0.247 276    0.060 184    0.051 253    0.098 155    0.074  49    0.014 248    0.014  18
DCP 6     .099      2.087     0.788  23    0.696  38    0.257 269    0.052  43    0.114 215    0.057 115    0.045  86    0.011 116    0.042 358
DCP 7     .149      1.545     1.010  37    0.514 359    0.233 338    0.128 285    0.077 269    0.023 290    0.044 270    0.039 189    0.028 345
DCP 8     .200      1.261     0.888  36    0.425 351    0.188 289    0.132 266    0.044 233    0.050 239    0.049 206    0.043 158    0.019 138
DCP 9     .250      1.087     0.778  26    0.316 318    0.156 278    0.082 205    0.075 142    0.032  76    0.022 117    0.029  47    0.006 300
DCP10     .300      0.957     0.676  33    0.275 304    0.147 309    0.071 175    0.075 112    0.039  65    0.017  55    0.025 353    0.015 264
DCP11     .399      0.790     0.591  33    0.232 307    0.133 297    0.057 160    0.073 102    0.049  73    0.017 327    0.019 314    0.017 252
DCP12     .501      0.586     0.478  36    0.188 298    [illegible] 187    0.056 118    0.072  60    0.052 331    0.026 261    0.019 326    0.017 175
DCP13     .600      0.469     0.391  43    0.164 287    0.136 166    0.051  87    0.062  28    0.054 292    0.031 227    0.026 167    0.025  75
DCP14     .701      0.425     0.297  52    0.138 276    0.096 163    0.046  55    0.051   1    0.053 264    0.032 187    0.027 119    0.027  30
DCP15     .800      0.221     0.221  44    0.175 260    0.084 133    0.035  39    0.037 342    0.036 244    0.022 153    0.021  83    0.015 352
DCP16     .900     -0.146     0.179  26    0.106 244    0.060 126    0.037  67    0.036 316    0.079 215    0.017 135    0.021  52    0.018 306
DCP17     .969     [illegible]     0.061  26    0.086 260    0.037 149    0.021  69    0.022 345    0.015 256    0.016 168    0.014  66    0.016 348
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0         68.75        0.182        0.582        5.71         0.0          10.54       12071.1       20

          V           Q            RN           CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                                    0.92E 07    -0.193        1.632        15.44       -0.00098      1.545        0.0
           192.5       98581.
          (631.7)     (2058.9)                              HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              10.539     5.711   0    0.632  34    0.255 210    0.079 206    0.020 108    0.059  93    0.020 211    0.018 299    0.021 118
CN                  0.926     0.457  48    0.164 353    0.041 313    0.031 251    0.013 160    0.012  87    0.003   8    0.005   4    0.003 312
CM                 -0.027     0.080 219    0.049  99    0.015  57    0.021  13    0.010 285    0.006 260    0.004 208    0.002 144    0.001 129

DCP 1     .010      3.032     0.427   9    0.659  57    0.157 315    0.026 341    0.044 276    0.041 189    0.019 135    0.038 165    0.025  75
DCP 2     .020      2.809     0.527  18    0.597  66    0.175 338    0.058  52    0.052 312    0.028 237    0.012 144    0.031 234    0.040 134
DCP 3     .030      2.688     0.358  24    0.552  69    0.219 350    0.073  16    0.057 299    0.021 203    0.007 147    0.037 218    0.027 127
DCP 4     .049      2.616     0.316  69    0.526  49    0.089 310    0.159  43    0.117 308    0.021  17    0.058 264    0.049 164    0.028  63
DCP 5     .074      2.521     0.360  89    0.514  42    0.024 295    0.162  21    0.100 272    0.042  45    0.048 264    0.020  48    0.034 273
DCP 6     .099      2.453     0.463 102    0.525  39    0.034 137    0.172   2    0.071 244    0.059   9    0.047 252    0.025  26    0.035 247
DCP 7     .149      1.798     0.775  61    0.441  49    0.156  65    0.105  25    0.051 163    0.013 107    0.028 249    0.026 265    0.021 292
DCP 8     .200      1.464     0.701  57    0.356  35    0.169  35    0.132   9    0.048  38    0.052  29    0.014  61    0.028  34    0.019  30
DCP 9     .250      1.295     0.761  44    0.293 354    0.168 346    0.133 291    0.036 285    0.039 276    0.004 298    0.024 322    0.003 222
DCP10     .300      1.113     0.672  42    0.256 342    0.140 327    0.128 268    0.045 240    0.036 239    0.024 206    0.012  86    0.014 305
DCP11     .399      0.929     0.629  49    0.230 336    0.093 322    0.122 265    0.045 219    0.033 211    0.019 175    0.022 161    0.016 140
DCP12     .501      0.728     0.564  46    0.213 316    0.066 288    0.117 238    0.054 171    0.050 149    0.040  99    0.030  66    0.010  43
DCP13     .600      0.593     0.490  47    0.203 302    0.064 249    0.100 207    0.050 129    0.051 115    0.039  57    0.026  25    0.017 146
DCP14     .701      0.504     0.382  50    0.179 290    0.059 226    0.082 188    0.052 108    0.046  75    0.028  10    0.022 328    0.008 241
DCP15     .800      0.298     0.322  39    0.169 281    0.065 219    0.081 159    0.043  73    0.031  39    0.015 333    0.011 287    0.003  75
DCP16     .900      0.006     0.218  23    0.119 276    0.063 226    0.063 149    0.041  69    0.032  26    0.025 317    0.018 254    0.010 232
DCP17     .969     -0.053     0.085  27    0.063 295    0.029 250    0.032 175    0.022 106    0.016  46    0.008  17    0.015 279    0.005 278
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0        68.70      0.185      0.572      5.61        0.0        12.54     12073.1      20

              V          Q           RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TOR         EXT DAMP
               189.2      95871.      0.91E 07  -0.201      1.721       15.30     -0.00147    2.292       0.0
              (620.9)    (2002.3)                                 HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            12.537   5.615   0   0.407  22   0.091 268   0.038 268   0.028  38   0.024 234   0.003 244   0.013 149   0.013 318
CN                1.033   0.476  70   0.119  33   0.057  41   0.020   8   0.012 301   0.004 243   0.006 221   0.003 227   0.007 207
CM               -0.029   0.103 219   0.029 139   0.026 131   0.011 110   0.011  81   0.004  74   0.005  54   0.001 355   0.003  17

DCP 1   .010      3.503   0.338 136   0.417  63   0.068 153   0.124  67   0.025  78   0.059  60   0.027  17   0.045   1   0.042 324
DCP 2   .020      3.282   0.284 119   0.428  76   0.099 149   0.130  84   0.018  99   0.053  98   0.027  69   0.035  58   0.034  51
DCP 3   .030      3.090   0.359 129   0.525  75   0.077 105   0.121  68   0.030  31   0.026  45   0.004 237   0.016  40   0.006   9
DCP 4   .049      2.884   0.527 130   0.370  59   0.243 144   0.140  56   0.075 141   0.057  62   0.052 105   0.050  15   0.015 115
DCP 5   .074      2.690   0.685 131   0.297  51   0.286 130   0.091  29   0.106 122   0.017 282   0.075 106   0.017 321   0.034  84
DCP 6   .099      2.561   0.920 134   0.212  48   0.313 113   0.020 341   0.120 102   0.042 201   0.070  82   0.021 194   0.026  50
DCP 7   .149      2.150   0.990 113   0.121 126   0.226  83   0.087 168   0.012  10   0.024 113   0.029 131   0.035 175   0.023 223
DCP 8   .200      1.597   0.812  77   0.335  86   0.247 101   0.103 129   0.030 150   0.058 193   0.013 216   0.020 246   0.015 267
DCP 9   .250      1.411   0.768  61   0.268  55   0.195  61   0.063  58   0.051  69   0.022 128   0.008 120   0.018 301   0.012 182
DCP10   .300      1.236   0.692  56   0.237  47   0.182  37   0.081  48   0.064  16   0.034  66   0.014 327   0.007 131   0.013 155
DCP11   .399      1.020   0.630  61   0.154  33   0.137  22   0.058  17   0.071 350   0.029   5   0.023 320   0.014   2   0.009 295
DCP12   .501      0.804   0.574  55   0.108  10   0.107   0   0.055 353   0.071 316   0.029 319   0.040 287   0.008 264   0.012 273
DCP13   .600      0.653   0.541  55   0.113 341   0.096 337   0.055 315   0.060 292   0.034 289   0.034 272   0.018 285   0.028 239
DCP14   .701      0.551   0.452  54   0.107 321   0.089 307   0.046 284   0.059 248   0.025 245   0.033 219   0.015 189   0.022 201
DCP15   .800      0.357   0.408  43   0.129 320   0.104 290   0.046 265   0.056 221   0.020 194   0.017 180   0.009 153   0.016 185
DCP16   .900      0.056   0.294  33   0.113 324   0.081 284   0.042 270   0.044 201   0.022 223   0.025 150   0.013 115   0.012  99
DCP17   .969     -0.039   0.120  40   0.062 341   0.039 297   0.025 289   0.018 262   0.010 183   0.018 214   0.010 140   0.012 126


                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                0.0        68.61      0.188      0.562      5.62        0.0        15.09     12073.2      20

              V          Q           RN         CM(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TOR         EXT DAMP
               185.9      93218.      0.90E 07  -0.175      1.681       15.66     -0.00165    2.516       0.0
              (610.0)    (1946.9)                                 HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.090   5.618   0   0.261 349   0.023 150   0.031  81   0.037  47   0.025   4   0.016 178   0.005 153   0.009  72
CN                1.083   0.474  75   0.078  84   0.030 122   0.024 126   0.011  88   0.036  26   0.002 290   0.003  50   0.003 352
CM               -0.063   0.115 216   0.023 206   0.005 177   0.009 234   0.007 226   0.004 211   0.003 213   0.001 209   0.000 213

DCP 1   .010      3.480   0.829 140   0.330  46   0.160 115   0.041 336   0.030 102   0.022 229   0.033 136   0.030 122   0.018  71
DCP 2   .020      3.304   0.860 145   0.270  69   0.218 137   0.022 318   0.066 131   0.022 268   0.021 187   0.026 205   0.016 184
DCP 3   .030      3.221   0.716 150   0.282  73   0.155 155   0.009 202   0.047 128   0.067 294   0.029 191   0.019 273   0.006 310
DCP 4   .049      2.873   0.823 146   0.029 287   0.164 149   0.124 238   0.018 234   0.036 281   0.051 287   0.020 242   0.032  90
DCP 5   .074      2.684   0.872 139   0.128 230   0.105 114   0.134 216   0.054 306   0.015 345   0.042 289   0.027  17   0.026   0
DCP 6   .099      2.524   0.953 132   0.236 211   0.041  69   0.090 191   0.054 265   0.027 327   0.025 210   0.010 212   0.013 331
DCP 7   .149      2.043   0.777 105   0.201 165   0.011 109   0.029 197   0.018 114   0.007  67   0.027 262   0.010 311   0.019 278
DCP 8   .200      1.607   0.647  92   0.159 130   0.043 152   0.051 168   0.015 220   0.012 129   0.009 233   0.006 220   0.010 282
DCP 9   .250      1.568   0.719  83   0.222 117   0.052 153   0.051 160   0.010 194   0.037 344   0.007 257   0.010  43   0.007 341
DCP10   .300      1.377   0.678  72   0.238 100   0.088 126   0.078 135   0.020 181   0.014 147   0.007 147   0.019  67   0.015  82
DCP11   .399      1.124   0.654  67   0.190  91   0.072 134   0.077 135   0.050 161   0.032 192   0.027 215   0.008 179   0.033 216
DCP12   .501      0.868   0.569  56   0.105  70   0.030 125   0.054  95   0.037 110   0.009  79   0.007  99   0.008 134   0.004 238
DCP13   .600      0.697   0.552  52   0.089  50   0.037  82   0.038  71   0.037  93   0.013  78   0.026  83   0.038 147   0.010  23
DCP14   .731      0.592   0.495  45   0.073  22   0.012 343   0.043  48   0.044  35   0.029  35   0.019  31   0.016  56   0.006 202
DCP15   .800      0.414   0.457  40   0.101  14   0.027 324   0.032  17   0.032  22   0.027  11   0.014  11   0.017 325   0.006 341
DCP16   .900      0.107   0.316  38   0.098   0   0.032  15   0.019   9   0.032   3   0.018 352   0.016 314   0.006 328   0.006  16
DCP17   .969     -0.016   0.152  49   0.056  10   0.022  36   0.013  42   0.016  17   0.020  19   0.007  25   0.009  13   0.006  80
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H         ALPHA.O     TEST POINT   CYCLES ANALYSED
                 0.0       23.08       0.052         0.694        4.88       0.0           0.02       12075.1       20

               V          Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP   TDR          EXT DAMP
                226.0      127390.     0.10E 08     -0.058        0.807        4.66       -0.00117     2.098        0.0
               (741.5)    (2660.6)                                     HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               0.016    4.884   0   0.082 349   0.153 344   0.118 153   0.034 326   0.064  96   0.071 317   0.024 132   0.021 229
CN                  0.130    0.667 350   0.024 332   0.008 103   0.009 139   0.005 339   0.001 123   0.002  37   0.003 189   0.002 183
CM                 -0.022    0.032 332   0.005  60   0.001  54   0.001 324   0.002 113   0.001 142   0.001 240   0.001 357   0.000  67

DCP 1    .010      -0.928    2.696 345   0.180 264   0.308 312   0.029   7   0.108 292   0.031   1   0.035 280   0.036 316   0.008 244
DCP 2    .020      -0.778    2.513 348   0.071 339   0.259 319   0.076  27   0.057 309   0.055   7   0.018   5   0.033 329   0.022  43
DCP 3    .030      -0.606    2.390 347   0.152  37   0.223 321   0.112  31   0.325 341   0.063  11   0.040  59   0.022 347   0.042  56
DCP 4    .049      -0.217    2.282 347   0.245  48   0.156 322   0.120  31   0.049  85   0.028  18   0.067  66   0.029 144   0.034  55
DCP 5    .074       0.025    2.143 346   0.309  49   0.066 330   0.104  24   0.100  86   0.035 156   0.050  48   0.074 133   0.032 208
DCP 6    .099       0.233    2.046 346   0.321  48   0.036  58   0.023  22   0.093  78   0.110 163   0.025 259   0.060 134   0.075 198
DCP 7    .149       0.315    1.836 346   0.204  42   0.132 111   0.171 200   0.028  93   0.128 169   0.073 219   0.067 284   0.034  42
DCP 8    .200       0.406    1.441 350   0.094 265   0.112 124   0.192 207   0.032 200   0.047 334   0.049  80   0.064 333   0.013  17
DCP 9    .250       0.432    1.125 348   0.239 247   0.121 127   0.077 197   0.043 152   0.112 356   0.016 297   0.036 352   0.055 245
DCP10    .300       0.373    0.843 350   0.268 250   0.153 146   0.105  47   0.057 288   0.040 347   0.040 280   0.045 153   0.019  92
DCP11    .399       0.208    0.461 357   0.059 267   0.016 199   0.060  44   0.051 302   0.022 185   0.009  61   0.016 175   0.012  71
DCP12    .501       0.124    0.293   0   0.027  32   0.042 315   0.004  88   0.014 307   0.011 169   0.013  73   0.002 307   0.007 252
DCP13    .600       0.131    0.218   1   0.031  42   0.034 318   0.014 190   0.003  21   0.003  19   0.004  65   0.006 176   0.004 256
DCP14    .701       0.229    0.144   2   0.022  50   0.020 314   0.011 180   0.003   3   0.002 332   0.003  75   0.004 176   0.003 246
DCP15    .800       0.088    0.070   8   0.005 356   0.005 344   0.308 165   0.002  76   0.003 316   0.004  71   0.004 182   0.003 211
DCP16    .900      -0.121    0.006  96   0.009 260   0.005 125   0.005 168   0.003  45   0.003 353   0.003  50   0.005 168   0.003 186
DCP17    .969      -0.058    0.030 184   0.002 245   0.007 122   0.005 172   0.003  91   0.001 314   0.001 279   0.003 194   0.001  14
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ    K             MACH NO     DEL.ALPHA   DEL.H         ALPHA.O     TEST POINT   CYCLES ANALYSED
                 0.0       22.37       0.050         0.696        5.16       0.0           2.33       12075.2       20

               V          Q           RN            CM(MIN)     CN(MAX)     ALPHA.NMAX    AERO DAMP   TDR          EXT DAMP
                226.5      128118.     0.10E 08     -0.038        1.031        7.14       -0.00133     2.387        0.0
               (743.1)    (2675.8)                                     HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.327    5.161   0   0.211  23   0.050 326   0.015 266   0.036 278   0.042 119   0.030 356   0.029 190   0.006 208
CN                  0.398    0.581 355   0.088  14   0.045 281   0.019 187   0.005 148   0.009 114   0.006 353   0.002 223   0.001 139
CM                 -0.013    0.021 303   0.010 121   0.008  39   0.005 309   0.003 244   0.002 171   0.002 100   0.002   3   0.002 274

DCP 1    .010       0.102    2.610 346   0.395  32   0.054 271   0.094  32   0.055  88   0.050 150   0.003   1   0.012 157   0.022 200
DCP 2    .020       0.172    2.292 349   0.410  40   0.048 160   0.049  78   0.028  77   0.040 165   0.025 255   0.022 300   0.002 240
DCP 3    .030       0.314    2.045 349   0.421  42   0.112 145   0.049 138   0.015 314   0.020 173   0.032 259   0.042 312   0.023  38
DCP 4    .049       0.674    1.756 348   0.396  46   0.101 141   0.071 182   0.084 280   0.061 348   0.037  59   0.006 116   0.019  43
DCP 5    .074       0.946    1.406 349   0.206  39   0.058 296   0.054  38   0.016  91   0.007 231   0.018  53   0.021 132   0.011 185
DCP 6    .099       1.082    1.374 349   0.206  42   0.068 297   0.067  33   0.022  90   0.008 132   0.006 108   0.003 248   0.004  20
DCP 7    .149       1.034    1.374 349   0.152  38   0.123 308   0.037  44   0.045 286   0.018  33   0.031 251   0.030 335   0.012 213
DCP 8    .200       0.937    1.303 351   0.077  23   0.164 319   0.044 211   0.067 294   0.021 136   0.055 280   0.016 166   0.040 248
DCP 9    .250       0.800    1.027 351   0.144  44   0.297 319   0.189 216   0.011 250   0.090 171   0.032  29   0.026 171   0.028 246
DCP10    .300       0.615    0.792 359   0.152 349   0.138 307   0.138 238   0.074 185   0.094 158   0.075  81   0.026  65   0.042  19
DCP11    .399       0.445    0.563   2   0.093 326   0.027 218   0.039 243   0.060 147   0.027  73   0.026  61   0.024 339   0.004 220
DCP12    .501       0.316    0.396   7   0.095 331   0.064 209   0.023 137   0.036 126   0.041  49   0.029 338   0.018 284   0.012 239
DCP13    .600       0.249    0.246  11   0.069 354   0.053 215   0.037 112   0.021  60   0.024  18   0.025 311   0.024 236   0.017 165
DCP14    .701       0.272    0.104  28   0.069  28   0.032 242   0.029 111   0.023  22   0.018 312   0.017 245   0.016 176   0.015  99
DCP15    .800       0.112    0.069  31   0.034   2   0.028 236   0.021 114   0.015  14   0.011 297   0.009 230   0.011 153   0.010  80
DCP16    .900   [illegible]  0.029  29   0.030 280   0.024 210   0.020  94   0.014 350   0.011 281   0.009 211   0.012 128   0.010  52
DCP17    .969   [illegible]  0.026 173   0.017 272   0.014 225   0.009  97   0.006 329   0.001 250   0.003 233   0.004 139   0.005  63
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0         22.39       0.050       0.698       5.00        0.0         4.95       12075.3      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             226.3      128075.      0.10E 08   -0.056       1.121        8.37      -0.00177     3.193       0.0
            (742.6)    (2674.9)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.947     5.075   0   0.199  31   0.028 235   0.039  77   0.049 359   0.013  86   0.032 217   0.034 192   0.000 125
CN                 0.637     0.431   4   0.127  34   0.035 359   0.031 307   0.010 216   0.003 292   0.003 296   0.006 227   0.004 148
CM                -0.010     0.024 258   0.015 131   0.005  97   0.007  78   0.004 355   0.001 269   0.000 299   0.001  18   0.001 291

DCP 1    .010      1.283     1.780 350   0.354  36   0.059  49   0.042 238   0.005 355   0.009 243   0.018 257   0.009 251   0.005  65
DCP 2    .020      1.250     1.568 354   0.270 • 31  0.034  86   0.043 246   0.014 151   0.006 217   0.010 217   0.004 130   0.004  93
DCP 3    .030      1.296     1.374 354   0.219  24   0.029 105   0.044 243   0.021 152   0.007 217   0.011 197   0.006 102   0.003 104
DCP 4    .049      1.501     1.149 354   0.221  31   0.042 123   0.028 230   0.015 130   0.005 156   0.006 244   0.004  95   0.003  38
DCP 5    .074      1.596     1.013 354   0.203  33   0.031 118   0.020 221   0.004 156   0.007  32   0.002   5   0.003 107   0.007  27
DCP 6    .099      1.700     0.967 353   0.220  39   0.049 114   0.028 229   0.005 239   0.007 157   0.005 244   0.006 344   0.010  10
DCP 7    .149      1.577     0.972 351   0.328  52   0.055  77   0.047 309   0.047 124   0.057 160   0.015 314   0.004 115   0.028 205
DCP 8    .200      1.320     0.805 353   0.459  63   0.123 351   0.089   0   0.045 135   0.023 199   0.047  72   0.048 164   0.004 152
DCP 9    .250      1.068     0.610 358   0.439  59   0.117 345   0.215  22   0.061 273   0.091 352   0.015 144   0.014 294   0.027  69
DCP10    .300      0.867     0.580   9   0.228  56   0.186   9   0.107   2   0.096 319   0.067 340   0.054 308   0.056 297   0.023 271
DCP11    .399      0.661     0.470  11   0.073  26   0.100   4   0.058 271   0.041 310   0.028 233   0.024 289   0.020 226   0.007 244
DCP12    .501      0.484     0.363  19   0.094 352   0.051 352   0.073 272   0.025 228   0.028 230   0.015 213   0.022 206   0.017 165
DCP13    .600      0.377     0.258  25   0.093 343   0.018 303   0.055 269   0.036 194   0.016 196   0.020 168   0.012 158   0.018 145
DCP14    .701      0.344     0.132  47   0.074 343   0.030 209   0.022 245   0.032 160   0.016  88   0.008  91   0.007  89   0.010  71
DCP15    .800      0.160     0.111  39   0.066 328   0.030 226   0.019 227   0.026 145   0.014  62   0.005  38   0.002  32   0.004  62
DCP16    .900     -0.089     0.083  25   0.057 310   0.026 245   0.021 229   0.023 140   0.011  65   0.007  51   0.003   8   0.005  30
DCP17    .969     -0.075     0.012  69   0.026 310   0.011 255   0.010 258   0.010 163   0.005  98   0.005  43   0.003 224   0.004 108

                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0         22.94       0.051       0.703       4.97        0.0         7.47       12077.1      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             229.0       129741.     0.10E 08   -0.071       1.147        8.83      -0.00199     3.634       0.0
            (751.3)     (2709.7)                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              7.467     4.970   0   0.160  33   0.056 276   0.059 167   0.022  49   0.007 103   0.007 208   0.039  80   0.017 279
CN                 0.823     0.265  22   0.097  59   0.042  79   0.023  66   0.012 343   0.002  49   0.001  70   0.008  64   0.003 327
CM                -0.020     0.037 224   0.008 120   0.007 219   0.005 193   0.004 150   0.001 162   0.001 167   0.002 186   0.001  95

DCP 1    .010      2.088     1.158 356   0.251  58   0.062  34   0.028  65   0.005 295   0.012  62   0.006 313   0.004  29   0.004 168
DCP 2    .020      1.921     1.066 359   0.181  58   0.077  35   0.018  48   0.027 349   0.013 334   0.017 287   0.005 135   0.003 259
DCP 3    .030      1.894     0.977 359   0.144  49   0.079  14   0.009 296   0.017 327   0.006  47   0.013 324   0.005  34   0.007 332
DCP 4    .049      2.009     0.788   0   0.117  42   0.046  20   0.011 277   0.013 297   0.006 214   0.002 333   0.005   3   0.006 297
DCP 5    .074      2.007     0.628   1   0.146  56   0.057  22   0.016 284   0.013 298   0.016 258   0.010 190   0.007  67   0.005 272
DCP 6    .099      2.041     0.460   1   0.207  69   0.084  18   0.017 308   0.021 328   0.027 269   0.019 194   0.006  86   0.009 214
DCP 7    .149      1.893     0.246  14   0.270  63   0.045  18   0.053  49   0.053 316   0.025 241   0.014 212   0.008 143   0.001 229
DCP 8    .200      1.633     0.110  95   0.292  68   0.062 119   0.094  62   0.028 349   0.021  25   0.018 300   0.008 151   0.004  11
DCP 9    .250      1.390     0.143  93   0.245  60   0.245 131   0.081 186   0.004 357   0.020   6   0.065  67   0.046 121   0.021  78
DCP10    .300      1.071     0.310  37   0.291  79   0.204 133   0.111 147   0.047 153   0.051 155   0.031 218   0.013  79   0.015  27
DCP11    .399      0.812     0.365  23   0.139  70   0.028 100   0.079  72   0.030 108   0.018 114   0.006 115   0.011 130   0.010 284
DCP12    .501      0.628     0.334  27   0.069  57   0.052  38   0.066  55   0.020  40   0.026  56   0.015 111   0.024  90   0.010  53
DCP13    .600      0.499     0.278  33   0.031   0   0.060  36   0.039  33   0.033   3   0.022  34   0.017  48   0.028  28   0.006  16
DCP14    .701      0.427     0.186  43   0.049 294   0.041  37   0.023 322   0.029 333   0.014 298   0.010 330   0.016 352   0.013 301
DCP15    .800      0.247     0.185  31   0.052 302   0.036  30   0.028 316   0.028 309   0.012 268   0.009 298   0.009 290   0.007 222
DCP16    .900     -0.024     0.143  17   0.033 311   0.032   7   0.020 331   0.028 295   0.011 273   0.008 267   0.010 322   0.010 235
DCP17    .969     -0.060     0.032  22   0.011 314   0.006  18   0.010  31   0.015 312   0.003 268   0.003 302   0.006   7   0.005 253
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0       23.03      0.051      0.704      4.90       0.0        9.04      12077.2      20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR         EXT DAMP
                228.7      129703.    0.10E 08  -0.076      1.104      10.36     -0.00167    3.032       0.0
               (750.4)    (2708.9)                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             9.841   4.901   0  0.219  13  0.044 276  0.012 134  0.024 347  0.022  42  0.014 137  0.014  59  0.022 312
CN                0.935   0.187  35  0.041 103  0.019 150  0.004 149  0.007 172  0.001  39  0.002 208  0.003   0  0.005  29
CM               -0.031   0.045 207  0.007  14  0.003 281  0.002 335  0.003 309  0.001  14  0.001  59  0.002  73  0.001 102

DCP 1    .010     2.498   0.814   1  0.199  66  0.036 130  0.007 150  0.014 129  0.004 211  0.007 164  0.008 315  0.006 236
DCP 2    .020     2.331   0.824   2  0.184  72  0.024  48  0.019  84  0.011 157  0.007 233  0.012 165  0.002 354  0.001 347
DCP 3    .030     2.153   0.609   2  0.262  80  0.054  18  0.041  86  0.016  32  0.015 249  0.013 137  0.003 310  0.004  42
DCP 4    .049     2.260   0.563   3  0.163  72  0.060  11  0.015 349  0.009 252  0.004 115  0.007 198  0.007 123  0.007  59
DCP 5    .074     2.171   0.330   9  0.213  76  0.055  12  0.030  49  0.031 325  0.006 199  0.002 323  0.005 130  0.010  56
DCP 6    .099     2.168   0.179  18  0.214  77  0.019  81  0.057  68  0.023 330  0.017  78  0.010 336  0.011  89  0.013  11
DCP 7    .149     1.991   0.095  93  0.160  71  0.089 146  0.047  55  0.032 152  0.034  57  0.007 152  0.023  65  0.008  51
DCP 8    .200     1.730   0.221 136  0.078  77  0.131 155  0.018 141  0.047 153  0.003 275  0.034 160  0.007 111  0.019 119
DCP 9    .250     1.530   0.271 136  0.078 244  0.011 216  0.057 216  0.051 270  0.011  31  0.013 259  0.020 340  0.017  30
DCP10    .300     1.305   0.246 116  0.134 222  0.097 258  0.048 319  0.009 192  0.021 334  0.017   8  0.031  49  0.019  53
DCP11    .399     0.989   0.213  48  0.026  85  0.038 187  0.025 248  0.010 235  0.009  89  0.003 356  0.006  11  0.009  28
DCP12    .501     0.751   0.288  35  0.070  97  0.064 163  0.037 234  0.009 245  0.018 324  0.007  32  0.006 326  0.014  20
DCP13    .600     0.573   0.299  26  0.055 111  0.037 133  0.022 179  0.017 183  0.019 235  0.007 295  0.019 313  0.013 340
DCP14    .701     0.473   0.249  24  0.032 188  0.026  60  0.023  95  0.021 124  0.010 180  0.011 210  0.009 251  0.007 269
DCP15    .800     0.309   0.239  15  0.030 186  0.033  36  0.016 103  0.016 107  0.012 131  0.008 154  0.006 220  0.007 177
DCP16    .900     0.016   0.173  10  0.015 153  0.013  57  0.016 107  0.014  96  0.004 178  0.004 235  0.010 195  0.004 230
DCP17    .969    -0.058   0.042  20  0.004 118  0.036  45  0.008  89  0.002 249  0.005 149  0.004 304  0.010 212  0.006 250
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
                 0.0       23.05      0.051      0.705      4.90       0.0       12.49      12077.3      20

               V          Q          RN         CM(MIN)    CN(MAX)    ALPHA,NMAX AERO DAMP  TDR         EXT DAMP
                228.7      129636.    0.10E 08  -0.098      1.147      16.13     -0.00145    2.641       0.0
               (750.5)    (2707.5)                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA            12.491   4.899   0  0.177  16  0.037 285  0.018 175  0.020   7  0.027  74  0.018 226  0.007 249  0.006  60
CN                0.999   0.157  37  0.027  80  0.014 125  0.008 199  0.002 113  0.001 201  0.001  38  0.003 267  0.002  76
CM               -0.049   0.049 201  0.004 236  0.002 159  0.001 350  0.002 143  0.000 308  0.001 153  0.000 328  0.001 204

DCP 1    .010     2.669   0.467   1  0.116  78  0.028 127  0.019 134  0.010 133  0.016  59  0.008 204  0.012 111  0.006 351
DCP 2    .020     2.607   0.496   2  0.152  80  0.034 131  0.021 178  0.011 101  0.006  41  0.006 144  0.014 148  0.007  41
DCP 3    .030     2.424   0.361   1  0.161  86  0.073 129  0.004  50  0.018 143  0.015   8  0.016 144  0.010  36  0.005 204
DCP 4    .049     2.381   0.220   9  0.254  80  0.034  51  0.026  73  0.012 346  0.013  65  0.009   3  0.002 342  0.008 287
DCP 5    .074     2.276   0.100  21  0.184  82  0.055 150  0.043 102  0.029 130  0.024  77  0.015  97  0.008  49  0.005 116
DCP 6    .099     2.240   0.071 117  0.140  79  0.075 154  0.018 151  0.051 144  0.006  87  0.023 144  0.003 162  0.014 142
DCP 7    .149     2.048   0.160 133  0.006 345  0.089 153  0.049 216  0.027 154  0.021 193  0.004 225  0.014 234  0.009 206
DCP 8    .200     1.753   0.270 141  0.113 237  0.050 137  0.084 234  0.012 279  0.017 235  0.020 322  0.008 251  0.007 248
DCP 9    .250     1.433   0.147  95  0.073 237  0.011  86  0.008 343  0.023  79  0.006  22  0.005 298  0.017 301  0.001 183
DCP10    .300     1.232   0.148  64  0.026 264  0.023  96  0.024 249  0.010 102  0.012 298  0.003 108  0.011 297  0.004 173
DCP11    .399     1.048   0.194  56  0.023  32  0.015  37  0.003  24  0.003   7  0.011 279  0.008  53  0.013 307  0.003  77
DCP12    .501     0.855   0.226  42  0.024  76  0.009  50  0.005 202  0.004 329  0.001 185  0.002  43  0.009 287  0.010  97
DCP13    .600     0.695   0.248  29  0.036  72  0.009  29  0.008 108  0.006 294  0.007 193  0.004  69  0.005 164  0.006  71
DCP14    .701     0.574   0.259  18  0.038  79  0.001 107  0.007 164  0.004 312  0.002 166  0.002   8  0.010 146  0.006  42
DCP15    .800     0.396   0.258  10  0.036  79  0.004 231  0.014 130  0.003 330  0.006  82  0.004 278  0.004 132  0.009   1
DCP16    .900     0.086   0.176   9  0.019  54  0.003 254  0.009 209  0.004 334  0.005 103  0.003 308  0.004  97  0.006 292
DCP17    .969    -0.047   0.039  27  0.009  22  0.004   3  0.008 259  0.005 331  0.004  42  0.002 266  0.003 340  0.002  56
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       23.02      0.168       0.204      7.09        0.0         2.43       12153.2      20

               V          Q           RN         CN(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                 69.7      12506.     0.33E 07   -0.059      0.999      10.41       -0.00133     0.757       0.0
               (228.8)    (261.2)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.430    7.889   0   0.655 356   0.121 319   0.032 355   0.061 324   0.018 357   0.017 265   0.040 232   0.019 277
CN                 0.373    0.597 359   0.043  13   0.004  51   0.005  26   0.005  51   0.005  18   0.011 338   0.025 213   0.004 163
CM                -0.022    0.028 294   0.003 272   0.002 308   0.001 214   0.003 256   0.003 218   0.004 153   ..009   7   0.001 331

DCP 1     .010     0.931    4.176 347   0.303   6   0.064 125   0.030  70   0.033 306   0.009 202   0.005 135   0.054 268   0.011  91
DCP 2     .020     0.793    3.122 350   0.194 357   0.026 329   0.018  49   0.027 299   0.006 196   0.005 298   0.064 286   0.016  82
DCP 3     .030     1.018    2.658 350   0.157 354   0.031 325   0.008  30   0.015 296   0.012 225   0.005 248   0.038 285   0.010 107
DCP 4     .049     0.829    2.159 351   0.129 347   0.028 330   0.010  18   0.006 235   0.013 190   0.007 227   0.043 297   0.002 357
DCP 5     .074     0.820    1.749 351   0.102 354   0.017 338   0.005 307   0.010 295   0.005 245   0.001 158   0.031 288   0.001 234
DCP 6     .099     0.937    1.471 352   0.086 357   0.020   6   0.011  12   0.009 236   0.006 161   0.001 175   0.030 286   0.005 282
DCP 7     .149     0.664    1.094 354   0.071   2   0.001 292   0.005 249   0.008  17   0.008 289   0.003 241   0.036 280   0.009 147
DCP 8     .200     0.592    0.899 358   0.068   7   0.005 291   0.002 103   0.003 118   0.008 180   0.012 103   0.033 305   0.007 217
DCP 9     .250     0.485    0.773 359   0.060   4   0.017 359   0.010  55   0.007 310   0.004 269   0.023  10   0.026 176   0.009 114
DCP10     .300     0.480    0.655 359   0.058  14   0.019  25   0.008 326   0.005 318   0.012 340   0.012 348   0.029 178   0.008 203
DCP11     .399     0.411    0.534   7   0.049  24   0.009  73   0.011  21   0.009  56   0.005  26   0.014 353   0.045 207   0.008 233
DCP12     .501     0.285    0.407  11   0.035  33   0.003  85   0.003 155   0.013  28   0.013  11   0.011 320   0.032 200   0.007 138
DCP13     .600     0.315    0.312  16   0.029  39   0.006 253   0.002  72   0.012  67   0.011   1   0.017 310   0.024 204   0.004  53
DCP14     .701     0.293    0.213  24   0.033  42   0.015 135   0.008 354   0.015  69   0.008  33   0.021 339   0.036 190   0.005 252
DCP15     .800     0.155    0.132  35   0.012  41   0.014 102   0.010  12   0.009 130   0.008  11   0.016 355   0.028 191   0.003 216
DCP16     .900    -0.039    0.055  54   0.011 169   0.007 202   0.011  85   0.013  57   0.010  62   0.013 301   0.039 188   0.009 136
DCP17     .969     0.018    0.017 173   0.006 334   0.009  54   0.003 350   0.007  55   0.019  79   0.022 342   0.025 202   0.020 128
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                          FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                 0.0       23.09      0.171       0.200      7.09        0.0         4.03       12153.3      20

               V          Q           RN         CN(MIN)    CN(MAX)     ALPHA,NMAX  AERO DAMP   TOR         EXT DAMP
                 68.5      12133.     0.32E 07   -0.055      1.153      12.57       -0.00144     0.810       0.0
               (224.9)    (253.4)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.033    7.095   0   0.622 357   0.123 313   0.029   4   0.051 326   0.015 353   0.017 226   0.026 272   0.021 277
CN                 0.505    0.596   0   0.047  33   0.014 335   0.003 300   0.004 327   0.004 283   0.002 108   0.011  11   0.006 284
CM                -0.015    0.031 294   0.007 285   0.002 115   0.001 125   0.001 194   0.002  66   0.001  22   0.005 201   0.002 104

DCP 1     .010     2.339    3.906 347   0.349  27   0.157 750   0.112 240   0.058 137   0.008  56   0.037 117   0.011  18   0.027 290
DCP 2     .020     1.911    3.167 350   0.211   2   0.031  10   0.015  34   0.011 328   0.002 200   0.014 104   0.030 235   0.012 261
DCP 3     .030     1.974    2.721 350   0.169 358   0.027   5   0.016  19   0.009  20   0.005 330   0.003 171   0.013 251   0.003 344
DCP 4     .049     1.618    2.206 350   0.138 354   0.025 337   0.002 310   0.002  47   0.004 282   0.005   6   0.014 218   0.003 314
DCP 5     .074     1.460    1.780 351   0.116 359   0.021  11   0.004   4   0.004 221   0.004  43   0.006  57   0.014 216   0.003 229
DCP 6     .099     1.475    1.491 353   0.098   4   0.025  41   0.003  43   0.009 340   0.005  16   0.008 147   0.020 229   0.003 247
DCP 7     .149     1.068    1.111 355   0.071   2   0.012  38   0.006 195   0.005 273   0.006  98   0.004  40   0.013 190   0.006 248
DCP 8     .200     0.915    0.917 359   0.059  14   0.019   6   0.004 225   0.011 357   0.008   0   0.005 342   0.020 213   0.006  29
DCP 9     .250     0.754    0.779 359   0.072  24   0.022 318   0.002  17   0.012 310   0.006 283   0.007 134   0.025   0   0.011 214
DCP10     .300     0.719    0.649   1   0.059  34   0.011 306   0.012 328   0.006 324   0.004 325   0.008 234   0.017   6   0.010 255
DCP11     .399     0.598    0.512   8   0.048  51   0.014 317   0.005  31   0.001 256   0.009 307   0.004 332   0.023  26   0.020 321
DCP12     .501     0.421    0.399  13   0.045  58   0.016 310   0.007  69   0.009 289   0.008 341   0.004 231   0.011   0   0.006 270
DCP13     .600     0.412    0.306  18   0.048  60   0.020 337   0.002 279   0.010 333   0.011 296   0.009 249   0.019  29   0.008 322
DCP14     .701     0.361    0.212  26   0.045  71   0.020 331   0.006 276   0.003 246   0.008 211   0.000 169   0.012  24   0.009 215
DCP15     .800     0.189    0.135  38   0.025  97   0.004 345   0.006 229   0.006 119   0.008 240   0.007  72   0.025  30   0.010 286
DCP16     .900    -0.039    0.056  51   0.015 114   0.015 228   0.011 302   0.014   6   0.007 293   0.018 200   0.016 339   0.008 272
DCP17     .969    -0.003    0.017 132   0.002 241   0.011 336   0.003  17   0.012 303   0.021 199   0.009  56   0.033  26   0.004 352
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

          TUNED HZ     DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          23.13        0.174         0.199        7.91         0.0          7.43        12153.4       20

           V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
            67.8        11893.        0.32E 07    -0.048        1.377        15.29       -0.00154      0.857        0.0
          (222.5)      (248.4)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              7.430    7.906   0    0.585 357    0.080 298    0.022  82    0.030 329    0.012  93    0.021 176    0.029 237    0.009 293
CN                 0.807    0.589   2    0.050  17    0.009 354    0.006   6    0.001 153    0.005 232    0.001 230    0.008 292    0.004 293
CM                -0.008    0.033 292    0.004 257    0.000  37    0.001 161    0.002 313    0.001  38    0.000  65    0.002  90    0.001 128

DCP 1     .010     3.749    3.604 347    0.375  29    0.077 349    0.101  60    0.134 317    0.052 219    0.052 297    0.057 230    0.015 188
DCP 2     .020     3.115    3.140 351    0.215 359    0.056   5    0.007 280    0.009  31    0.020 207    0.005  37    0.025 330    0.007 316
DCP 3     .030     3.003    2.720 351    0.185 355    0.034   3    0.006 302    0.006 346    0.011 227    0.008 188    0.015 345    0.003 343
DCP 4     .049     2.469    2.193 352    0.174 357    0.028 323    0.014   5    0.014 263    0.006 239    0.011 265    0.019 350    0.007 274
DCP 5     .074     2.144    1.765 352    0.129 358    0.023   3    0.013   3    0.009 302    0.006 226    0.013 206    0.020   3    0.002 116
DCP 6     .099     2.037    1.471 354    0.118   1    0.018 351    0.015  30    0.007 286    0.016 173    0.002 265    0.018 342    0.005 265
DCP 7     .149     1.485    1.101 356    0.072   4    0.025  13    0.013 357    0.014 286    0.016 342    0.003  25    0.018 345    0.011 330
DCP 8     .200     1.250    0.913 359    0.056   9    0.016  14    0.010 292    0.006  43    0.011 231    0.016 121    0.021 356    0.003 256
DCP 9     .250     1.047    0.775   1    0.060 359    0.006 268    0.003 355    0.001 246    0.008 294    0.011  99    0.010 249    0.006 268
DCP10     .300     0.962    0.646   2    0.053  12    0.014 351    0.003   9    0.005 116    0.013 259    0.002 168    0.010 223    0.010 280
DCP11     .399     0.789    0.512  10    0.045  30    0.006  31    0.004  14    0.003 148    0.005 250    0.006 263    0.013 255    0.006 243
DCP12     .501     0.567    0.403  16    0.039  32    0.009 333    0.009  15    0.003 118    0.005 217    0.002 244    0.002 194    0.005 243
DCP13     .600     0.509    0.300  23    0.046  53    0.008 344    0.010   4    0.004 141    0.011 180    0.005 352    0.005 186    0.007   8
DCP14     .701     0.417    0.197  34    0.052  58    0.002 157    0.003 281    0.008 183    0.003 159    0.006 240    0.014 272    0.003 349
DCP15     .800     0.223    0.134  44    0.033  53    0.005  91    0.002 243    0.006  72    0.007 189    0.003 186    0.016 274    0.009 277
DCP16     .900    -0.027    0.080  47    0.029 271    0.009 154    0.003 297    0.010 139    0.014 321    0.002  42    0.011 331    0.008  22
DCP17     .969    -0.009    0.023  60    0.008 321    0.023 306    0.013  41    0.013 134    0.008 166    0.006 230    0.009 282    0.014 273

                         FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

          TUNED HZ     DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
           0.0          23.11        0.174         0.198        7.88         0.0          9.92        12153.5       20

           V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
            67.6        11831.        0.32E 07    -0.050        1.617        17.83       -0.00119      0.662        0.0
          (221.7)      (247.1)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              9.920    7.883   0    0.649 357    0.094 295    0.032  28    0.035 324    0.021   7    0.005 298    0.031 230    0.012 261
CN                 0.916    0.631  16    0.069 309    0.035  93    0.006 274    0.008  79    0.007  18    0.001  64    0.017 238    0.007 248
CM                -0.010    0.024 257    0.021 356    0.014 220    0.006  30    0.003 234    0.001 252    0.001 237    0.005  52    0.003  56

DCP 1     .010     4.625    3.472 358    0.375 346    0.077 177    0.105  89    0.021  93    0.099  51    0.046 340    0.025  39    0.064 343
DCP 2     .020     3.855    3.076   1    0.313 329    0.030 104    0.020 327    0.011 290    0.017 328    0.001 316    0.025 290    0.012 357
DCP 3     .030     3.649    2.725   0    0.262 319    0.048 102    0.031 346    0.017 276    0.001 125    0.006 329    0.019 278    0.010 325
DCP 4     .049     2.620    1.760  17    0.678   0    0.261 252    0.116 141    0.049  62    0.043 356    0.034 279    0.031 224    0.000 240
DCP 5     .074     2.281    1.479  19    0.553 349    0.222 223    0.103  95    0.025 344    0.025 353    0.023 256    0.020 212    0.002 126
DCP 6     .099     2.165    1.319  19    0.433 339    0.179 147    0.094  63    0.021 294    0.011   2    0.018 218    0.006 259    0.009 260
DCP 7     .149     1.672    1.133  14    0.261 311    0.123 150    0.091   9    0.024 203    0.013 352    0.027 164    0.002 252    0.011 277
DCP 8     .200     1.443    1.010  14    0.190 292    0.111 125    0.057 343    0.024 221    0.016 309    0.015 112    0.038 304    0.012 217
DCP 9     .250     1.213    0.866  12    0.126 285    0.097  92    0.052 301    0.017 142    0.011   0    0.010   3    0.029 227    0.014 149
DCP10     .300     1.107    0.731  13    0.082 267    0.090  85    0.050 292    0.015 118    0.004 355    0.007  41    0.029 226    0.001 170
DCP11     .399     0.904    0.607  18    0.063 241    0.083  77    0.037 288    0.019  92    0.007 102    0.007  73    0.030 237    0.006 285
DCP12     .501     0.650    0.484  23    0.050 221    0.074  66    0.030 246    0.020 114    0.010  75    0.006  18    0.011 208    0.002 303
DCP13     .600     0.553    0.376  29    0.043 201    0.070  54    0.029 231    0.020  68    0.005   9    0.007   8    0.014 230    0.018 263
DCP14     .701     0.447    0.270  38    0.042 172    0.058  38    0.033 204    0.028  50    0.003 224    0.008 159    0.015 215    0.011 239
DCP15     .800     0.245    0.182  42    0.052 173    0.046  21    0.032 178    0.013  45    0.004  41    0.002 124    0.022 234    0.011 209
DCP16     .900     0.010    0.116  27    0.032 184    0.019 356    0.020 136    0.013 312    0.002 122    0.005 345    0.019 238    0.014 241
DCP17     .969     0.006    0.042   9    0.015 229    0.009  93    0.012 119    0.005 256    0.017  16    0.003  84    0.019 258    0.010 240
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0       23.12      0.175      0.197       7.02       0.0       12.22     12153.6       20

          V          Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                                 0.32E 07  -0.277       2.160      19.06     -0.00006    0.035       0.0
           67.4       11703.
          (221.2)    (246.1)                          HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0      RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA              12.219    7.824   0  0.676 350  0.150 303  0.014 201  0.071   2  0.034 266  0.028 269  0.028 284  0.016 275
CN                  1.070    0.710  20  0.224 300  0.133 166  0.004  62  0.053 316  0.033 224  0.010 109  0.031 351  0.011 244
CM                 -0.038    0.062 180  0.066  41  0.045 291  0.028 180  0.021  86  0.012 352  0.009 248  0.010 169  0.004  59

DCP 1    .010       4.199    1.813  47  1.556  24  0.431 290  0.101 270  0.225 215  0.151 145  0.098 126  0.069  45  0.031 310
DCP 2    .020       3.630    1.927  41  1.278  14  0.425 282  0.101 205  0.078 179  0.051  88  0.025  88  0.062 337  0.022 265
DCP 3    .030       3.455    1.771  40  1.154  11  0.457 278  0.102 195  0.119 130  0.103  57  0.078 337  0.096 276  0.069 194
DCP 4    .049       2.952    1.502  37  0.881  11  0.360 272  0.164 157  0.076  40  0.045 256  0.042 133  0.050 345  0.023 254
DCP 5    .074       2.614    1.403  35  0.745 355  0.330 243  0.171 134  0.082  31  0.021 295  0.010  82  0.053 304  0.033 201
DCP 6    .099       2.450    1.324  34  0.655 342  0.324 226  0.172 119  0.080  44  0.029 346  0.025 313  0.052 285  0.037 184
DCP 7    .149       1.905    1.191  30  0.519 322  0.266 203  0.134 114  0.082  40  0.052 321  0.014 255  0.047 289  0.035 181
DCP 8    .200       1.642    1.079  29  0.454 316  0.232 202  0.153 123  0.171  43  0.071 303  0.026 269  0.027 255  0.031 155
DCP 9    .250       1.435    1.038  25  0.415 302  0.265 187  0.182 102  0.142   9  0.104 280  0.051 222  0.028 145  0.028  74
DCP10    .300       1.325    0.910  25  0.372 292  0.242 176  0.171  86  0.129 353  0.088 262  0.056 200  0.032  89  0.038  13
DCP11    .399       1.114    0.808  26  0.333 280  0.247 165  0.175  73  0.134 339  0.093 255  0.066 175  0.069  56  0.046 351
DCP12    .501       0.836    0.675  24  0.282 263  0.221 143  0.151  48  0.116 311  0.079 225  0.064 127  0.065  23  0.037 296
DCP13    .600       0.715    0.562  23  0.264 247  0.209 127  0.150  23  0.115 204  0.079 197  0.063  91  0.059 354  0.025 268
DCP14    .701       0.584    0.421  22  0.250 229  0.210 111  0.135   6  0.115 255  0.066 158  0.056  59  0.057 333  0.043 222
DCP15    .800       0.357    0.308  18  0.207 221  0.160 105  0.113 359  0.098 243  0.059 141  0.055  48  0.060 328  0.044 208
DCP16    .900       0.076    0.212   5  0.126 221  0.076  92  0.069 336  0.043 235  0.036 130  0.030  39  0.033 318  0.009 164
DCP17    .969       0.046    0.102 359  0.054 213  0.049  90  0.035 323  0.032 219  0.024  96  0.033 336  0.010 207  0.011  87

                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA  DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
            0.0       23.03      0.114      0.301       7.91       0.0        0.65     12155.1       20

          V          Q          RN         CN(MIN)    CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                                 0.49E 07  -0.040       0.803       8.65     -0.00086    0.709       0.0
          102.5       27359.
          (336.4)    (571.4)                          HARMONIC ANALYSIS
DATA
TYPE      X/C     RES 0      RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA               0.647    7.909   0  0.575 357  0.079 301  0.015 100  0.032 324  0.022  95  0.019 162  0.029 230  0.004 277
CN                  0.141    0.670 357  0.042   3  0.010 326  0.005 301  0.005 322  0.004 272  0.003 226  0.000  43  0.004 204
CM                 -0.017    0.019 299  0.004 319  0.001 724  0.001  71  0.001 153  0.001 163  0.000 249  0.001  21  0.001  18

DCP 1    .010      -0.616    4.680 349  0.391   9  0.122 315  0.118  11  0.043  90  0.038 190  0.017 214  0.009  16  0.009 222
DCP 2    .020      -0.247    3.409 352  0.259 351  0.070 323  0.026 299  0.018 276  0.021 250  0.021 221  0.019  30  0.003 331
DCP 3    .030       0.083    2.846 352  0.214 342  0.057 318  0.021 297  0.017 281  0.021 248  0.016 226  0.011   9  0.007 243
DCP 4    .049       0.215    2.319 352  0.183 342  0.040 299  0.012 311  0.018 301  0.014 245  0.011 236  0.014 345  0.004 216
DCP 5    .074       0.306    1.895 352  0.150 345  0.029 294  0.008 301  0.016 294  0.009 250  0.009 229  0.009   1  0.003 236
DCP 6    .099       0.419    1.607 353  0.125 350  0.025 294  0.001 319  0.015 302  0.009 264  0.012 235  0.012  20  0.005 240
DCP 7    .149       0.279    1.208 354  0.090 347  0.011 272  0.008 335  0.007 320  0.005 223  0.008 245  0.011  43  0.004  17
DCP 8    .200       0.251    0.996 357  0.074 351  0.007 266  0.003 321  0.008 342  0.013 273  0.013 221  0.016  33  0.004 123
DCP 9    .250       0.193    0.889 356  0.054   8  0.014 329  0.003 312  0.007 342  0.001 198  0.001 181  0.001 203  0.001 129
DCP10    .300       0.198    0.768 356  0.044  10  0.006   4  0.007 261  0.003 329  0.004 182  0.001 190  0.004 182  0.008 203
DCP11    .399       0.183    0.593   2  0.033  24  0.011  15  0.004 242  0.006 308  0.003 314  0.003 221  0.005 227  0.004 206
DCP12    .501       0.124    0.459   3  0.027  35  0.011 350  0.004 307  0.006   4  0.004 289  0.002 321  0.005 204  0.003 179
DCP13    .600       0.151    0.351   7  0.019  33  0.006  59  0.006 289  0.008 331  0.006 320  0.001  70  0.004 193  0.008 230
DCP14    .701       0.208    0.247   9  0.017  65  0.009 350  0.004 259  0.004 319  0.002 331  0.002 208  0.001 217  0.005 175
DCP15    .800       0.097    0.144  16  0.010  68  0.005   0  0.003 285  0.004 309  0.003 237  0.001 341  0.006 174  0.009 211
DCP16    .900      -0.075    0.040  38  0.010 173  0.004 250  0.007 264  0.004 317  0.005 339  0.004 174  0.004 257  0.003 251
DCP17    .969      -0.027    0.027 169  0.005 211  0.007 304  0.002 315  0.004 132  0.004   4  0.004  35  0.002 131  0.006  94
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
             0.0         23.03       0.116       0.298        7.91         0.0           2.23       12155.2       20

           V            Q            RN          CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
            101.3        26885.      0.48E 07   -0.039        1.030        10.25        -0.00094      0.768        0.0
           (332.4)      (561.5)
                                                              HARMONIC ANALYSIS
DAT
TYPE       X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 2.235      7.912   0    0.609 356    0.099 312    0.016  23    0.043 343    0.006  19    0.011 156    0.021 249    0.013 322
CN                    0.354      0.691 356    0.047   8    0.011   8    0.002 357    0.003 317    0.002 295    0.002 262    0.002 251    0.001 306
CM                   -0.015      0.022 304    0.003 282    0.001 222    0.001 212    0.001 117    0.000 123    0.001  75    0.000 107    0.000 305

DCP 1     .010        0.773      4.815 348    0.390  13    0.061  73    0.050 176    0.021 189    0.010  10    0.015 301    0.015 253    0.006 277
DCP 2     .020        0.764      3.610 351    0.231 353    0.066 348    0.012 344    0.010 295    0.003 267    0.008 276    0.008 281    0.007 274
DCP 3     .030        0.935      3.039 350    0.188 347    0.042 334    0.010 345    0.016 297    0.007 267    0.008 263    0.003 259    0.007 307
DCP 4     .049        0.932      2.481 351    0.152 343    0.030 328    0.008 292    0.009 341    0.006 226    0.007 315    0.008 248    0.009 296
DCP 5     .074        0.895      2.009 351    0.125 349    0.026 331    0.007 317    0.004 338    0.005 239    0.004 254    0.002 184    0.004 327
DCP 6     .099        0.917      1.692 352    0.110 357    0.020 339    0.006 334    0.003 308    0.004 359    0.004 260    0.006 220    0.006 305
DCP 7     .149        0.649      1.265 353    0.079 354    0.018 345    0.002 227    0.004 334    0.003 254    0.002 165    0.003 236    0.003 348
DCP 8     .200        0.542      1.039 356    0.066   6    0.014  10    0.005 100    0.004  29    0.005 271    0.005 227    0.004 204    0.004 285
DCP 9     .250        0.494      0.896 355    0.064   5    0.014   0    0.008  15    0.007 314    0.001 281    0.001  77    0.003 350    0.003  57
DCP10     .300        0.461      0.753 356    0.054   7    0.015  10    0.004   0    0.005   1    0.003   3    0.003 320    0.003 229    0.002  79
DCP11     .399        0.391      0.600   1    0.045  19    0.011  10    0.005 319    0.003 332    0.001 245    0.005  83    0.002 161    0.002 192
DCP12     .501        0.281      0.459   4    0.034  24    0.008  28    0.003 268    0.005 346    0.005 304    0.003 259    0.002 250    0.002 285
DCP13     .600        0.268      0.351   7    0.031  34    0.012  45    0.003 357    0.005 283    0.008 296    0.004 196    0.001 224    0.003 138
DCP14     .701        0.283      0.235  10    0.024  52    0.010  18    0.003  60    0.000 322    0.001 332    0.002 354    0.003 286    0.003 342
DCP15     .800        0.140      0.140  17    0.017  62    0.010  30    0.007  45    0.001 182    0.002  39    0.006 286    0.005 350    0.002 159
DCP16     .900       -0.071      0.047  27    0.006  51    0.003  15    0.005 296    0.008 282    0.004 159    0.006 222    0.002 176    0.003 291
DCP17     .969       -0.034      0.021 181    0.010 263    0.002 320    0.006 125    0.003  43    0.004 296    0.006 278    0.006 252    0.005  97

                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

           TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
             0.0         23.02       0.116       0.297        7.88         0.0           4.72       12155.3       20

           V            Q            RN          CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
            100.7        26669.      0.48E 07   -0.035        1.260        12.74        -0.00103      0.840        0.0
           (330.5)      (557.0)
                                                              HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 4.722      7.878   0    0.614 356    0.098 304    0.017   2    0.027 334    0.024 339    0.015 165    0.019 223    0.013 265
CN                    0.591      0.675 357    0.059  11    0.009 323    0.001 100    0.003 340    0.004 322    0.000 191    0.000 163    0.001 348
CM                   -0.010      0.025 305    0.003 254    0.000 115    0.001 350    0.000 171    0.001 198    0.000 207    0.000 341    0.000  82

DCP 1     .010        2.504      4.671 348    0.361 346    0.065 174    0.070  83    0.074 333    0.059 252    0.025 137    0.003 118    0.015  82
DCP 2     .020        1.981      3.527 351    0.266   7    0.076 342    0.032 294    0.010 189    0.006 310    0.005 156    0.011  25    0.008 357
DCP 3     .030        1.979      3.047 351    0.219 355    0.039 324    0.014 339    0.003 268    0.011 315    0.006 138    0.006  27    0.005   7
DCP 4     .049        1.790      2.482 351    0.180 355    0.043 331    0.010 313    0.003 179    0.006 317    0.003 236    0.006 357    0.009  19
DCP 5     .074        1.588      1.995 351    0.152 358    0.033 327    0.005 327    0.003 289    0.010 322    0.004 328    0.003  56    0.004  43
DCP 6     .099        1.494      1.673 352    0.135   4    0.022 337    0.004 246    0.004  36    0.009 316    0.003 188    0.005 332    0.005  70
DCP 7     .149        1.085      1.253 353    0.097   2    0.022 329    0.004   7    0.004 302    0.003 354    0.006 257    0.004 300    0.006 351
DCP 8     .200        0.900      1.029 357    0.080   9    0.017 299    0.002  72    0.005 265    0.008 325    0.001 254    0.003  23    0.005 304
DCP 9     .250        0.799      0.873 356    0.077   9    0.016 323    0.002 339    0.003  49    0.002 317    0.004 248    0.004 121    0.003 177
DCP10     .300        0.720      0.731 357    0.068  15    0.009 312    0.007 107    0.007   0    0.009 301    0.003 300    0.003 177    0.006  92
DCP11     .399        0.593      0.579   2    0.063  23    0.005 356    0.003 254    0.007  27    0.002 338    0.002 354    0.003 358    0.000 170
DCP12     .501        0.438      0.444   5    0.045  33    0.005 300    0.002  54    0.006 301    0.005   6    0.006 123    0.006 203    0.004 313
DCP13     .600        0.378      0.332   9    0.038  31    0.010 335    0.002 289    0.005   4    0.004 322    0.003 154    0.009 211    0.004 265
DCP14     .701        0.359      0.220  15    0.038  37    0.005  34    0.003 173    0.001 113    0.002 321    0.004 335    0.001  10    0.003  93
DCP15     .800        0.181      0.132  22    0.023  31    0.005 276    0.007 141    0.002 285    0.003  17    0.002  66    0.004  55    0.001 304
DCP16     .900       -0.054      0.050  28    0.006   6    0.003 337    0.003 286    0.003 293    0.005  33    0.001 274    0.004  67    0.002 275
DCP17     .969       -0.038      0.014 154    0.008 286    0.010 270    0.006 146    0.003 125    0.004 226    0.001 258    0.006 192    0.004 272
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                                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                       TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                         0.0          23.03        0.117          0.295        7.86         0.0          7.34       12155.4        20

                       V            Q            RN             CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                        100.3        26468.        0.48E 07     -0.106         1.470        15.17       -0.00080      0.647        0.0
                       (329.0)      (552.8)
                                                                       HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 7.336     7.856   0    0.635 359    0.131 305    0.009 184    0.043  15    0.040 318    0.011 106    0.028 243    0.011 269
CN                    0.752  [illegible] 10  0.138 349    0.046 192    0.032  52    0.022 313    0.016 220    0.021 100    0.014 334    0.005 286
CM                   -0.014     0.021 245    0.022  62    0.023 308    0.016 193    0.009  96    0.006 353    0.007 253    0.007 115    0.002 357

DCP 1       .010      3.116     2.917 359    1.205  37    0.731 321    0.477 237    0.286 160    0.167  95    0.168  18    0.088 295    0.048 200
DCP 2       .020      2.505     2.319   2    1.041  39    0.599 322    0.415 234    0.287 148    0.177  71    0.131   3    0.065 296    0.041 258
DCP 3       .030      2.330     1.896   5    0.999  36    0.567 312    0.354 221    0.203 132    0.077  63    0.072  40    0.082 345    0.094 266
DCP 4       .049      2.358     2.047   0    0.464  12    0.157 289    0.074 190    0.056  87    0.037 340    0.026 278    0.027 162    0.022  81
DCP 5       .074      2.033     1.616   2    0.400  13    0.135 283    0.063 179    0.047  70    0.037 315    0.018 222    0.024 114    0.017  37
DCP 6       .099      1.852     1.335   4    0.355  12    0.126 273    0.070 162    0.052  51    0.041 297    0.024 204    0.029 107    0.018   9
DCP 7       .149      1.356     1.033   6    0.296   2    0.129 253    0.075 130    0.053  19    0.035 285    0.015 147    0.020  72    0.012  15
DCP 8       .200      1.159     0.931   9    0.257 347    0.141 215    0.098 100    0.071 357    0.049 256    0.032 165    0.024  70    0.015   0
DCP 9       .250      1.030     0.868   9    0.242 328    0.154 191    0.121  76    0.080 337    0.053 254    0.032 157    0.016  95    0.032   0
DCP10       .300      0.937     0.765   9    0.219 316    0.163 181    0.127  70    0.083 335    0.055 260    0.050 165    0.029  72    0.031 332
DCP11       .399      0.772     0.630  14    0.167 314    0.138 173    0.112  64    0.073 326    0.049 249    0.051 149    0.031  34    0.028 311
DCP12       .501      0.567     0.479  17    0.110 312    0.102 154    0.084  35    0.057 300    0.041 212    0.049 110    0.035 344    0.019 256
DCP13       .600      0.458     0.351  22    0.073 310    0.086 137    0.086  13    0.057 271    0.039 172    0.048  82    0.041 320    0.022 221
DCP14       .701      0.406     0.231  31    0.048 317    0.072 117    0.064 350    0.040 234    0.032 137    0.040  48    0.040 290    0.020 161
DCP15       .800      0.236     0.174  24    0.046 260    0.064 112    0.044 348    0.023 234    0.016 155    0.024  49    0.028 279    0.013 124
DCP16       .900     -0.014     0.096  12    0.041 227    0.037 104    0.033 328    0.011 249    0.016 118    0.022  22    0.028 261    0.011 137
DCP17       .969     -0.030     0.027   1    0.026 229    0.010  40    0.004 249    0.013 285    0.011 152    0.015  45    0.013 274    0.006 202
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                                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                       TUNED HZ     DRIVE HZ     K              MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                         0.0          23.08        0.117          0.295        7.81         0.0          9.96       12155.5        20

                       V            Q            RN             CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                        100.1        26420.        0.48E 07     -0.186         1.766        17.58       -0.00083      0.676        0.0
                       (328.4)      (551.8)
                                                                       HARMONIC ANALYSIS
DATA
TYPE        X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 9.959     7.808   0    0.605   2    0.126 324    0.044 314    0.049 221    0.074  59    0.026 208    0.044 235    0.008 288
CN                    0.878     0.501  26    0.228   8    0.082 274    0.055 189    0.041 104    0.027  28    0.022 320    0.020 250    0.014 180
CM                   -0.024     0.047 211    0.044  69    0.027   1    0.018 303    0.015 230    0.009 147    0.006 112    0.007  39    0.005 308

DCP 1       .010      3.492     1.037  14    1.916  62    0.856   0    0.369 319    0.243 283    0.122 267    0.183 239    0.157 186    0.127 140
DCP 2       .020      2.936     1.061  18    1.457  62    0.680 358    0.300 305    0.161 266    0.075 251    0.125 234    0.118 181    0.116 144
DCP 3       .030      2.687     0.828  21    1.303  62    0.590 359    0.232 309    0.139 294    0.135 267    0.156 219    0.111 161    0.093 132
DCP 4       .049      2.731     1.253  13    0.798  46    0.353 345    0.200 285    0.157 223    0.116 147    0.073  80    0.058  18    0.028 307
DCP 5       .074      2.326     1.002  38    0.691  40    0.283 327    0.137 258    0.093 197    0.078 116    0.046  42    0.029 339    0.016 261
DCP 6       .099      2.090     0.873  24    0.653  33    0.292 310    0.140 227    0.087 171    0.074 100    0.047  23    0.031 318    0.021 225
DCP 7       .149      1.593     0.811  26    0.526  17    0.231 284    0.113 209    0.072 157    0.071 103    0.036  24    0.027 340    0.016 314
DCP 8       .200      1.342     0.738  29    0.445  14    0.221 287    0.151 219    0.134 156    0.107  81    0.063  10    0.031 314    0.030 262
DCP 9       .250      1.170     0.732  27    0.381 359    0.192 270    0.129 202    0.110 130    0.079  56    0.036 332    0.022 327    0.020 280
DCP10       .300      1.055     0.660  26    0.342 351    0.175 260    0.132 195    0.112 122    0.077  45    0.040 344    0.033 317    0.038 260
DCP11       .399      0.885     0.592  30    0.276 344    0.145 251    0.110 186    0.100 112    0.068  37    0.039 359    0.035 301    0.034 240
DCP12       .501      0.675     0.499  29    0.211 332    0.112 229    0.093 163    0.091  83    0.055 359    0.035 317    0.041 268    0.040 197
DCP13       .600      0.559     0.408  30    0.170 317    0.100 203    0.078 137    0.083  59    0.059 342    0.038 297    0.043 238    0.036 168
DCP14       .701      0.489     0.301  35    0.129 299    0.096 178    0.065 114    0.064  39    0.047 312    0.026 268    0.041 209    0.034 123
DCP15       .800      0.299     0.242  24    0.118 275    0.085 166    0.057 102    0.047  26    0.026 302    0.031 269    0.033 195    0.028 101
DCP16       .900      0.033     0.157   9    0.078 261    0.037 163    0.041 108    0.037  10    0.021 262    0.007 256    0.027 192    0.026  87
DCP17       .969     -0.016     0.063  11    0.044 264    0.011 199    0.018 137    0.013   0    0.007 271    0.013 304    0.017 195    0.008  97
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                           FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSE)
                0.0         23.07         0.117       0.295        7.79          0.0         12.35       12155.6       20

              V            Q            RN           CH(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
               100.0        26401.       0.48E 07    -0.236        2.005        18.50       -0.00121      0.982        0.0
              (328.1)      (551.4)                                HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA            12.352    7.788   0    0.581   1    0.055 340    0.059  31    0.118 335    0.110 219    0.034   4    0.025  53    0.015 322
CN                1.001    0.461  45    0.256  21    0.100 323    0.061 265    0.052 227    0.048 153    0.030  73    0.027  74    0.017 344
CM               -0.039    0.073 206    0.045 107    0.023  71    0.021  18    0.015 347    0.017 276    0.010 211    0.006 215    0.006 117

DCP 1    .010     3.667    0.889 121    1.795  66    0.434  65    0.420  40    0.181  25    0.141  18    0.165  18    0.200 350    0.167 310
DCP 2    .020     3.122    0.727 102    1.451  66    0.361  48    0.315  30    0.139 352    0.066 352    0.095  14    0.113 354    0.142 322
DCP 3    .030     2.855    0.573 110    1.235  71    0.331  57    0.329  49    0.241   7    0.114 335    0.114 352    0.105 319    0.092 292
DCP 4    .049     3.034    0.700  38    0.871  66    0.394  28    0.236 345    0.166 305    0.119 255    0.071 237    0.066 181    0.035 154
DCP 5    .074     2.583    0.639  47    0.744  55    0.284  10    0.152 322    0.099 285    0.075 234    0.032 203    0.045 157    0.018 116
DCP 6    .099     2.311    0.666  53    0.699  46    0.260 353    0.150 307    0.109 265    0.087 211    0.035 162    0.035 138    0.011 114
DCP 7    .149     1.788    0.710  50    0.536  28    0.175 342    0.158 305    0.125 249    0.102 201    0.056 150    0.043 119    0.026  57
DCP 8    .200     1.488    0.663  53    0.483  30    0.207 343    0.167 297    0.116 254    0.106 215    0.070 151    0.035 128    0.028 102
DCP 9    .250     1.323    0.683  48    0.433  18    0.208 326    0.154 278    0.105 238    0.102 192    0.055 127    0.055 109    0.017  80
DCP10    .300     1.201    0.646  46    0.385  11    0.192 319    0.145 270    0.109 240    0.114 187    0.066 123    0.059 102    0.039  63
DCP11    .399     1.028    0.600  44    0.305   6    0.166 314    0.119 262    0.102 243    0.119 178    0.065 112    0.068 109    0.045  54
DCP12    .501     0.809    0.535  39    0.233 349    0.131 297    0.099 237    0.082 219    0.105 150    0.071  82    0.064  73    0.050   7
DCP13    .600     0.665    0.466  38    0.196 332    0.103 275    0.097 217    0.078 184    0.095 120    0.070  53    0.053  52    0.052 334
DCP14    .701     0.581    0.382  37    0.169 311    0.092 251    0.096 197    0.080 158    0.096  89    0.075  16    0.036 359    0.048 294
DCP15    .800     0.376    0.307  26    0.132 291    0.076 241    0.077 182    0.062 143    0.081  64    0.050   2    0.029 343    0.039 255
DCP16    .900     0.077    0.193  15    0.072 285    0.040 248    0.031 166    0.027 151    0.041  57    0.020 343    0.020   7    0.020 257
DCP17    .969    -0.001    0.085  13    0.048 299    0.028 254    0.016 144    0.005 161    0.026  57    0.017 348    0.006 208    0.013 211

                           FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0         22.73         0.086       0.398        7.91          0.0          0.01       12157.1       20

              V            Q            RN           CH(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TOR          EXT DAMP
               134.6        47866.       0.65E 07    -0.046        0.864         8.06       -0.00086      0.926        0.0
              (441.5)      (999.7)                                HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             0.010    7.909   0    0.644 356    0.106 316    0.015 330    0.045 343    0.013   9    0.015 215    0.047 239    0.016 281
CN                0.163    0.684 357    0.033 293    0.030 302    0.010 327    0.008 318    0.008 359    0.007  79    0.014 209    0.005 169
CM               -0.014    0.019 301    0.006 292    0.003  12    0.002  82    0.000 290    0.001  40    0.001 112    0.003  67    0.001 114

DCP 1    .010    -0.453    4.625 350    0.399 271    0.543 310    0.510  28    0.311  96    0.175 172    0.063 206    0.053 220    0.034 282
DCP 2    .020    -0.241    3.655 352    0.166 307    0.144 295    0.096 355    0.069  70    0.065 166    0.057 231    0.047 287    0.034  32
DCP 3    .030    -0.063    3.299 352    0.164  11    0.043 206    0.040 282    0.030  81    0.053 191    0.044 255    0.024 304    0.005  57
DCP 4    .049     0.213    2.666 352    0.121 358    0.052 185    0.076 244    0.060 315    0.035  39    0.030 125    0.036 209    0.008 285
DCP 5    .074     1.156    0.629   0    1.100 254    0.586 327    0.074  59    0.246 293    0.345  10    0.283  78    0.164 129    0.154 142
DCP 6    .099     0.390    1.827 353    0.096   5    0.012 204    0.035 233    0.033 300    0.018 359    0.018  98    0.028 198    0.005 269
DCP 7    .149     0.271    1.349 353    0.061   1    0.014 221    0.016 246    0.010 289    0.013 358    0.008  58    0.014 179    0.008 216
DCP 8    .200     0.226    1.099 356    0.050 359    0.009 295    0.010 260    0.009 298    0.009 323    0.006  51    0.021 189    0.008 188
DCP 9    .250     0.203    0.957 355    0.053   2    0.014 299    0.011 240    0.013 267    0.013 282    0.011 341    0.007 206    0.006 133
DCP10    .300     0.208    0.789 356    0.037 351    0.024 296    0.013 332    0.004   9    0.003 265    0.005 259    0.009 227    0.003 220
DCP11    .399     0.186    0.523   1    0.021 358    0.021 288    0.012 331    0.004  18    0.001 310    0.001 110    0.015 243    0.003 208
DCP12    .501     0.139    0.477   3    0.011  12    0.016 294    0.008 295    0.003 356    0.005 290    0.001 238    0.017 236    0.006 281
DCP13    .600     0.152    0.355   6    0.005  34    0.014 286    0.008 303    0.005 298    0.004 290    0.002 131    0.014 239    0.004 173
DCP14    .701     0.219    0.246   8    0.006 121    0.011 279    0.008 313    0.002 310    0.002 265    0.004 358    0.012 226    0.004 211
DCP15    .800     0.101    0.135  18    0.013 158    0.014 261    0.007 306    0.005   7    0.002 342    0.003  10    0.012 234    0.001 203
DCP16    .900    -0.074    0.037  59    0.024 202    0.016 261    0.006 274    0.001 251    0.002 292    0.003 145    0.015 219    0.004  70
DCP17    .969    -0.039    0.035 169    0.007 173    0.006 223    0.002 289    0.003 345    0.004 124    0.000 248    0.012 248    0.006 283
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                                  FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                    TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                     0.0           23.05         0.088        0.396        7.91         0.0           2.44       12157.2       20

                    V             Q             RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                     133.6          47406.       0.64E 07    -0.032        1.077        10.44       -0.00084      0.901        0.0
                    (438.4)       (990.1)
                                                                     HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 2.440     7.914   0    0.682 355    0.136 319    0.044 332    0.056 321    0.029 332    0.012 194    0.029 272    0.030 270
CN                    0.381     0.698 355    0.058 349    0.029 324    0.005 234    0.013 303    0.015   4    0.011 100    0.006 153    0.002 269
CM                   -0.006     0.019 305    0.009 256    0.002  61    0.000 102    0.002 275    0.002   8    0.002  72    0.002 176    0.001 148

DCP 1     .010        1.016     5.468 349    0.472 352    0.168 144    0.068 200    0.044 175    0.049  56    0.049 319    0.028 250    0.015 292
DCP 2     .020        0.923     3.851 351    0.304 342    0.055 267    0.076  73    0.091   3    0.089 266    0.068 186    0.040  92    0.033 343
DCP 3     .030        1.001     3.181 351    0.235 356    0.101 330    0.034 288    0.010 260    0.005 327    0.007 246    0.003 228    0.017 323
DCP 4     .049        1.070     2.631 351    0.192 353    0.083 330    0.034 269    0.009 243    0.004 346    0.005 243    0.005 221    0.003 298
DCP 5     .074        1.729     0.839 354    0.889 261    0.472 336    0.117 186    0.413 291    0.523  12    0.440  89    0.257 160    0.078 186
DCP 6     .099        0.971     1.802 352    0.143   2    0.048 326    0.010 275    0.006 291    0.008 350    0.004 240    0.004 166    0.005 308
DCP 7     .149        0.701     1.343 353    0.107 359    0.028 330    0.008 275    0.005 337    0.008 242    0.002 212    0.008 174    0.002  19
DCP 8     .200        0.572     1.101 355    0.089   7    0.024 330    0.006 273    0.005 339    0.006 296    0.006 268    0.004 203    0.004 263
DCP 9     .250        0.499     0.949 355    0.087   5    0.022 314    0.007 311    0.010 309    0.004   1    0.002 217    0.003  54    0.006 338
DCP10     .300        0.452     0.790 355    0.076   7    0.018 314    0.005 328    0.006 314    0.004 328    0.002 129    0.002  11    0.003 311
DCP11     .399        0.372     0.628   0    0.064  19    0.018 317    0.004 278    0.006 351    0.003 316    0.002 208    0.002  62    0.004 302
DCP12     .501        0.276     0.480   2    0.053  21    0.016 314    0.003 305    0.004  45    0.003 352    0.003  79    0.003 331    0.001 296
DCP13     .600        0.245     0.354   4    0.043  33    0.016 319    0.006 268    0.002 294    0.003   9    0.003 197    0.002 277    0.000   1
DCP14     .701        0.280     0.235   7    0.043  43    0.018 308    0.005 225    0.003  57    0.003  67    0.004 149    0.002   8    0.003 266
DCP15     .800        0.128     0.131  14    0.031  45    0.016 302    0.004 231    0.003  76    0.004 337    0.003 183    0.004  44    0.003 329
DCP16     .900       -0.078     0.045  25    0.010  40    0.008 276    0.005 191    0.005 327    0.005 132    0.000  19    0.004  47    0.001 274
DCP17     .969       -0.050     0.027 168    0.006 227    0.008 210    0.002  50    0.003  23    0.007 246    0.005 171    0.002   8    0.003 317
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                                  FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                    TUNED HZ      DRIVE HZ      K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                     0.0           22.73         0.087        0.394        7.90         0.0           4.72       12157.3       20

                    V             Q             RN           CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                     133.1          47100.       0.64E 07    -0.030        1.265        12.52       -0.00090      0.959        0.0
                    (436.6)       (983.7)
                                                                     HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 4.717     7.896   0    0.742 354    0.217 324    0.093 311    0.062 302    0.053 329    0.034 251    0.067 248    0.043 261
CN                    0.548     0.600   1    0.142  13    0.062 290    0.028 170    0.011 338    0.015 359    0.011  92    0.012 212    0.004 247
CM                   -0.005     0.020 291    0.006 158    0.011   2    0.010 252    0.006 167    0.006  33    0.002  50    0.002  85    0.001 256

DCP 1     .010        2.032     4.051 349    0.799  52    0.568   3    0.482 280    0.328 203    0.144 120    0.046  54    0.023 170    0.037  81
DCP 2     .020        1.676     3.098 354    0.681  39    0.384 335    0.233 265    0.173 199    0.117 126    0.088  66    0.036   2    0.032 341
DCP 3     .030        1.728     2.745 354    0.529  30    0.288 322    0.159 248    0.116 173    0.079  97    0.056  45    0.042 343    0.050 288
DCP 4     .049        1.622     2.184 354    0.469  36    0.272 327    0.146 248    0.092 167    0.055  78    0.027   5    0.011 318    0.019 312
DCP 5     .074        1.985     0.861   0    0.432 293    0.434 333    0.302 204    0.375 285    0.566  14    0.429  89    0.265 169    0.066 239
DCP 6     .099        1.368     1.518 357    0.351  26    0.181 303    0.107 207    0.075 115    0.053  22    0.026 297    0.012 211    0.010 283
DCP 7     .149        1.026     1.178 358    0.260  13    0.137 281    0.092 177    0.061  83    0.043 354    0.025 268    0.009 223    0.013 250
DCP 8     .200        0.837     0.975   1    0.220  14    0.114 279    0.076 171    0.051  78    0.035 351    0.017 265    0.010 213    0.014 241
DCP 9     .250        0.752     0.844   1    0.218   5    0.106 268    0.060 153    0.040  41    0.029 316    0.009 246    0.018 252    0.012 204
DCP10     .300        0.671     0.712   2    0.187   1    0.088 257    0.056 134    0.039  25    0.024 298    0.006 209    0.015 257    0.008 194
DCP11     .399        0.542     0.562   7    0.144   7    0.064 253    0.047 122    0.039  11    0.024 270    0.013 178    0.006 278    0.003 257
DCP12     .501        0.399     0.423  10    0.117  11    0.049 251    0.033 109    0.029 352    0.016 251    0.008 131    0.013 247    0.003 111
DCP13     .600        0.322     0.300  14    0.100  17    0.036 255    0.029  97    0.025 327    0.016 226    0.004 111    0.012 235    0.007 156
DCP14     .701        0.318     0.176  25    0.093  28    0.027 245    0.031  81    0.024 322    0.017 205    0.006  79    0.010 228    0.004  72
DCP15     .800        0.158     0.116  27    0.045  12    0.020 206    0.024  68    0.019 312    0.013 190    0.001 110    0.009 202    0.002  38
DCP16     .900       -0.050     0.076  17    0.010 291    0.026 165    0.018  54    0.008 336    0.006 153    0.002  91    0.006 264    0.005 327
DCP17     .969       -0.048     0.005  52    0.018 273    0.019 163    0.008  68    0.010 255    0.002 193    0.005 178    0.003 237    0.004 332
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        22.97       0.088      0.394       7.83        0.0          7.46      12157.4      20

             V           Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               132.8       47018.     0.64E 07  -0.096       1.380       14.49      -0.00100     1.069       0.0
              (435.8)     (982.0)
                                                             HARMONIC ANALYSIS
DATA
TYPE    X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            7.457    7.834   0   0.577   2   0.110 330   0.028 316   0.049 301   0.057 148   0.037 324   0.027 244   0.007 278
CN               0.706    0.468  13   0.201  28   0.065 303   0.021 270   0.016 216   0.018  70   0.011  16   0.005 200   0.006 233
CM              -0.011    0.028 237   0.023 116   0.019  15   0.008 306   0.008 300   0.005 221   0.004 150   0.002 104   0.002  23

DCP 1   .010     3.033    2.653 347   1.172  76   0.679  25   0.302 342   0.236 323   0.149 276   0.095 271   0.083 275   0.104 222
DCP 2   .020     2.462    2.100 356   0.934  60   0.381  16   0.225 345   0.167 300   0.080 256   0.086 270   0.066 226   0.072 185
DCP 3   .030     2.276    1.688 354   0.875  69   0.462  24   0.312 336   0.222 282   0.135 224   0.059 208   0.048 173   0.054 135
DCP 4   .049     2.141    1.413   0   0.415  55   0.381 351   0.169 291   0.069 234   0.022 178   0.034 277   0.023 181   0.025 127
DCP 5   .074     2.191    0.583  22   0.497  47   0.469 323   0.269 277   0.254 308   0.289  30   0.245 103   0.190 171   0.041 236
DCP 6   .099     1.674    0.918   6   0.516  47   0.261 333   0.095 268   0.039 249   0.031 200   0.015 210   0.026 111   0.019  61
DCP 7   .149     1.283    0.799  11   0.468  35   0.203 311   0.066 253   0.041 229   0.039 169   0.016  87   0.021  81   0.021  30
DCP 8   .200     1.076    0.721  13   0.363  31   0.135 309   0.047 262   0.045 230   0.039 158   0.012  53   0.015 101   0.020  41
DCP 9   .250     0.948    0.679  13   0.309  18   0.119 286   0.043 237   0.048 198   0.045 125   0.029  39   0.015  51   0.023 337
DCP10   .300     0.843    0.591  14   0.263  12   0.105 276   0.041 226   0.049 183   0.047 110   0.032  26   0.014  10   0.021 315
DCP11   .399     0.704    0.517  18   0.206   8   0.083 259   0.029 207   0.044 167   0.039  89   0.029  24   0.013   1   0.024 292
DCP12   .501     0.533    0.408  21   0.154   2   0.059 243   0.016 179   0.029 155   0.031  64   0.024 352   0.009 327   0.020 255
DCP13   .600     0.425    0.307  27   0.124   1   0.052 228   0.014 110   0.019 133   0.027  49   0.021 341   0.015 260   0.018 210
DCP14   .701     0.388    0.197  36   0.099 358   0.051 204   0.025  88   0.011 125   0.024  37   0.017 317   0.009 244   0.014 198
DCP15   .800     0.219    0.167  32   0.070 326   0.053 191   0.020 101   0.018 108   0.024  15   0.016 317   0.011 243   0.012 173
DCP16   .900    -0.015    0.117  19   0.057 289   0.031 196   0.015 151   0.021  97   0.018   1   0.008 297   0.011 231   0.015 163
DCP17   .969    -0.039    0.019  13   0.038 279   0.013 211   0.009 177   0.009 128   0.009  24   0.003 307   0.008 241   0.008 137

                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        22.64       0.087      0.394       7.75        0.0          9.97      12157.5      20

             V           Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
              132.6        46947.     0.64E 07  -0.160       1.517       15.66      -0.00130     1.386       0.0
             (435.0)      (980.5)
                                                             HARMONIC ANALYSIS
DATA
TYPE    X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            9.965    7.749   0   0.587   3   0.052 323   0.066  36   0.071 353   0.103 299   0.120 158   0.016  51   0.017 319
CN               0.842    0.375  31   0.199  31   0.049   6   0.042 304   0.017 261   0.011 256   0.028 132   0.011  71   0.004  19
CM              -0.024    0.052 216   0.034 120   0.012  67   0.016  55   0.010 352   0.011 340   0.006 278   0.008 210   0.003 197

DCP 1   .010     3.627    1.313 343   1.373  85   0.455  52   0.266  85   0.293  53   0.173  20   0.119  27   0.026 346   0.056  37
DCP 2   .020     2.882    0.957 357   1.019  82   0.421  72   0.263  52   0.211  38   0.183 355   0.058 337   0.040 316   0.043 135
DCP 3   .030     2.598    0.652 352   1.013  87   0.475  62   0.247  31   0.150  21   0.141 355   0.077 331   0.054 297   0.059 307
DCP 4   .049     2.399    0.577  19   0.932  67   0.281  31   0.129  14   0.084   6   0.089 326   0.038 258   0.034 207   0.006   3
DCP 5   .074     2.464    0.447 117   0.323  44   0.347 356   0.048 354   0.313 308   0.365   6   0.274 100   0.231 177   0.121 249
DCP 6   .099     1.889    0.529  37   0.636  51   0.117  21   0.113  13   0.068 325   0.060 309   0.038 233   0.024 218   0.016 251
DCP 7   .149     1.501    0.608  33   0.467  35   0.073  19   0.109 353   0.070 301   0.066 283   0.053 204   0.020 200   0.022 204
DCP 8   .200     1.266    0.582  33   0.353  33   0.067  19   0.096 341   0.050 291   0.055 280   0.049 201   0.022 209   0.022 177
DCP 9   .250     1.119    0.555  30   0.298  25   0.080   9   0.103 319   0.054 261   0.054 253   0.057 182   0.014 120   0.022 131
DCP10   .300     1.001    0.508  30   0.250  21   0.082   0   0.106 306   0.059 251   0.061 230   0.060 161   0.024 109   0.027 103
DCP11   .399     0.847    0.481  32   0.207  14   0.056 350   0.085 297   0.047 238   0.047 219   0.051 157   0.025  86   0.022  91
DCP12   .501     0.663    0.419  32   0.167   2   0.039 323   0.066 272   0.033 211   0.043 199   0.044 131   0.027  68   0.021  51
DCP13   .600     0.538    0.354  35   0.142 350   0.029 291   0.060 257   0.034 187   0.035 175   0.038 113   0.033  42   0.018  13
DCP14   .701     0.478    0.268  41   0.122 333   0.033 236   0.053 232   0.039 155   0.032 140   0.039  87   0.035  21   0.020 348
DCP15   .800     0.293    0.231  33   0.107 317   0.038 249   0.056 223   0.038 151   0.034 130   0.030  71   0.028  17   0.012 343
DCP16   .900     0.031    0.173  21   0.075 303   0.033 263   0.044 215   0.026 158   0.028 127   0.017  52   0.027  16   0.008 321
DCP17   .969    -0.030    0.060  14   0.035 305   0.016 282   0.020 237  -0.009 206   0.012 147   0.008  85   0.020  39   0.005 307
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ    K           MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT  CYCLES ANALYSED
                   0.0         45.39       0.172       0.397        8.46        0.0          -0.01       12159.1      20

                 V            Q           RN          CM(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  134.5        48010.      0.65E 07   -0.073        0.790        8.63       -0.00087      0.955        0.0
                 (441.2)      (1002.7)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               -0.008    8.462   0   0.733 356   0.200 307   0.050 209   0.020 182   0.059  82   0.016 131   0.016 230   0.009 148
CN                   0.133    0.682 359   0.043  33   0.009 332   0.010 225   0.002 285   0.002 169   0.001 213   0.003 197   0.003 165
CM                  -0.017    0.039 296   0.009 305   0.002 305   0.003  10   0.001  17   0.001   3   0.001  96   0.001  51   0.000  54

DCP 1       .010    -0.525    4.501 345   0.253 281   0.546 292   0.489 358   0.316  60   0.168 121   0.066 153   0.041 150   0.035 181
DCP 2       .020    -0.294    3.549 350   0.190 347   0.111 291   0.071 305   0.057   8   0.043 113   0.049 191   0.034 285   0.037   8
DCP 3       .030    -0.085    3.162 349   0.236  12   0.004 140   0.038 243   0.022  43   0.049 156   0.049 215   0.025 296   0.004 321
DCP 4       .049     0.197    2.565 350   0.175   3   0.013 144   0.067 213   0.054 276   0.037 346   0.025  72   0.017 137   0.011 184
DCP 5       .074     0.303    2.064 350   0.156   6   0.016  44   0.050 199   0.047 258   0.036 325   0.029  40   0.026 102   0.024 154
DCP 6       .099     0.379    1.741 351   0.137   9   0.015   9   0.034 197   0.028 269   0.018 322   0.012  55   0.020 150   0.014 199
DCP 7       .149     0.269    1.280 353   0.093   9   0.013 351   0.014 205   0.016 243   0.013 338   0.007 357   0.007  62   0.014 167
DCP 8       .200     0.216    1.034 358   0.079  20   0.024 358   0.016 165   0.008 211   0.013 257   0.014 308   0.008 357   0.014  69
DCP 9       .250     0.195    0.902 357   0.069  21   0.017  11   0.007 190   0.010 192   0.012 174   0.009 227   0.006 238   0.003 293
DCP10       .300     0.201    0.751 359   0.052  27   0.019 330   0.006 254   0.005 317   0.004  97   0.007 143   0.008 229   0.004 227
DCP11       .399     0.180    0.602   9   0.049  51   0.013  20   0.016 229   0.002 236   0.002 208   0.003 187   0.005 245   0.001 178
DCP12       .501     0.133    0.459  14   0.037  66   0.010  41   0.010 229   0.001 287   0.006 208   0.005 235   0.003 238   0.004 120
DCP13       .600     0.148    0.348  20   0.036  77   0.007 344   0.010 193   0.002 223   0.009 192   0.004 289   0.009 214   0.002  82
DCP14       .701     0.208    0.246  26   0.036  84   0.007  84   0.013 190   0.002 102   0.004 221   0.007 229   0.001 148   0.002 203
DCP15       .800     0.395    0.152  40   0.029 104   0.008 135   0.011 183   0.000  90   0.004  90   0.004  61   0.004 128   0.002 217
DCP16       .900    -0.083    0.077  79   0.034 147   0.012 193   0.015 205   0.006 222   0.001 183   0.005 289   0.002 199   0.002 257
DCP17       .969    -0.041    0.043 151   0.014 153   0.009 186   0.013 218   0.002 174   0.007  98   0.003  72   0.009 253   0.005 205
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                              FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

                 TUNED HZ     DRIVE HZ    K           MACH NO      DEL.ALPHA   DEL.H        ALPHA.O      TEST POINT  CYCLES ANALYSED
                   0.0         45.07       0.172       0.395        8.44        0.0           2.44       12159.2      20

                 V            Q           RN          CM(MIN)      CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                  133.5        47464.      0.64E 07   -0.056        1.045       11.08       -0.00081      0.888        0.0
                 (437.9)      (991.3)
                                                                 HARMONIC ANALYSIS
DATA
TYPE        X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                2.440    8.442   0   0.757 356   0.199 309   0.046 102   0.005  47   0.021  58   0.018 212   0.011 250   0.006 196
CN                   0.370    0.683 358   0.062  20   0.014 345   0.016 135   0.003 214   0.001 196   0.001 276   0.003 185   0.001 148
CM                  -0.005    0.037 297   0.007 271   0.001 253   0.004 313   0.000  64   0.001   2   0.001 220   0.001   0   0.001 347

DCP 1       .010     1.079    5.204 343   0.422 342   0.181 126   0.081 121   0.040 143   0.047  20   0.044 271   0.020 217   0.002 231
DCP 2       .020     0.901    3.590 349   0.281 359   0.082 325   0.040 113   0.028 357   0.045 253   0.053 168   0.042  56   0.040 328
DCP 3       .030     1.021    3.039 348   0.219 356   0.092 325   0.019 203   0.017 181   0.010  60   0.012 279   0.005 227   0.003 309
DCP 4       .049     1.088    2.513 349   0.181 352   0.072 323   0.023 181   0.013 174   0.004  63   0.005 238   0.009 210   0.004 210
DCP 5       .074     1.026    2.029 349   0.155 357   0.052 321   0.013 174   0.007 157   0.005  29   0.002 265   0.009 165   0.002 111
DCP 6       .099     0.987    1.701 351   0.140   4   0.045 324   0.014 134   0.004 257   0.006 321   0.002 177   0.008 183   0.005 179
DCP 7       .149     0.720    1.765 352   0.107   4   0.030 333   0.015 153   0.004  95   0.005 119   0.003 311   0.010 142   0.002  49
DCP 8       .200     0.577    1.026 358   0.093  16   0.027 336   0.013 143   0.005 257   0.003 182   0.002  85   0.007 293   0.004 205
DCP 9       .250     0.501    0.889 356   0.086  16   0.019 343   0.016 101   0.004 239   0.001 171   0.011 232   0.003 288   0.002 182
DCP10       .300     0.457    0.749 358   0.077  17   0.019 334   0.011 126   0.007 195   0.002 252   0.003 279   0.003 162   0.004  59
DCP11       .399     0.381    0.599   8   0.065  39   0.018   0   0.018 129   0.008 235   0.004 208   0.004 265   0.003 244   0.004  42
DCP12       .501     0.285    0.458  12   0.051  46   0.012   1   0.016 123   0.003 268   0.005 237   0.006 332   0.002 184   0.001  97
DCP13       .600     0.256    0.346  18   0.046  47   0.012  19   0.015 147   0.005 294   0.004  88   0.003 136   0.006 198   0.001  29
DCP14       .701     0.260    0.233  24   0.043  53   0.007  24   0.018 142   0.004 124   0.004 168   0.005  38   0.002 186   0.002 186
DCP15       .800     0.132    0.147  38   0.030  69   0.005  20   0.019 133   0.002 339   0.005 218   0.003  88   0.006 139   0.003 1
DCP16       .900    -0.085    0.056  54   0.010  77   0.003 156   0.022 132   0.003 191   0.001 359   0.004  49   0.004 277   0.004
DCP17       .969    -0.057    0.033 158   0.008  10   0.005 177   0.016 134   0.003 193   0.006 150   0.003 290   0.006 133   0.009
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                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
              0.0         45.05       0.173       0.396       8.41        0.0         4.99      12159.3      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             132.6       47143.      0.64E 07   -0.044       1.271       13.28      -0.00087     0.952       0.0
            (435.9)     (984.6)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               4.994   8.414   0   0.729   0   0.199 294   0.096   4   0.043 106   0.038  91   0.010 101   0.012 164   0.010  99
CN                  0.559   0.629   8   0.118 347   0.009 198   0.026  10   0.016 212   0.002 340   0.010  26   0.006 278   0.011 197
CM                 -0.003   0.039 265   0.004  56   0.014 304   0.018 157   0.003  59   0.002 267   0.001 315   0.001 113   0.001   7

DCP 1     .010      2.068   3.740 348   0.911  35   0.681 326   0.525 229   0.270 140   0.028   6   0.096 132   0.119  42   0.063 302
DCP 2     .020      1.778   3.054 355   0.666  24   0.398 317   0.264 225   0.171 158   0.105  95   0.097  46   0.068 351   0.063 296
DCP 3     .030      1.814   2.720 354   0.502  13   0.286 307   0.199 213   0.154 137   0.118  59   0.095 356   0.078 288   0.070 217
DCP 4     .049      1.714   2.216 356   0.448   9   0.228 293   0.126 161   0.051  82   0.009 324   0.034  57   0.057 325   0.067 236
DCP 5     .074      1.742   1.361 356   0.597 314   0.411 345   0.418 111   0.241 108   0.234 285   0.178  19   0.043 108   0.130 200
DCP 6     .099      1.442   1.565 359   0.323 356   0.127 251   0.092 131   0.044  16   0.008 274   0.035   7   0.061 268   0.067 178
DCP 7     .149      1.093   1.234   1   0.241 338   0.098 213   0.084  98   0.046 336   0.013 253   0.025 298   0.036 216   0.038 129
DCP 8     .200      0.841   1.025   6   0.183 338   0.075 197   0.070  79   0.030 321   0.002 323   0.023 304   0.038 216   0.035 119
DCP 9     .250      0.776   0.845   4   0.146 328   0.079 162   0.068  26   0.037 284   0.009 162   0.008 283   0.019 165   0.020  67
DCP10     .300      0.686   0.759   6   0.114 326   0.065 146   0.066  12   0.030 269   0.013 193   0.009 173   0.017  90   0.018 323
DCP11     .399      0.560   0.638  16   0.085 335   0.065 145   0.071   9   0.034 273   0.009 177   0.007 135   0.002 152   0.007 304
DCP12     .501      0.407   0.46   23   0.070 343   0.051 136   0.063 353   0.026 227   0.013  91   0.007  88   0.010 355   0.010 260
DCP13     .600      0.325   0.34   33   0.063 359   0.037 137   0.065 345   0.023 219   0.010  98   0.005 106   0.009 339   0.015 245
DCP14     .701      0.316   0.244  48   0.065   3   0.028 128   0.057 333   0.023 204   0.012  54   0.007  55   0.010 297   0.015 195
DCP15     .800      0.153   0.168  53   0.030 339   0.037 117   0.059 332   0.020 202   0.009  58   0.008  55   0.012 283   0.015 177
DCP16     .900     -0.067   0.077  48   0.023 263   0.032  75   0.044 307   0.010 103   0.003 324   0.008   5   0.006 231   0.007 120
DCP17     .969     -0.058   0.018 117   0.019 263   0.012 100   0.038 333   0.008 146   0.005 343   0.006  79   0.010 292   0.009 185

                        FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
              0.0         45.11       0.174       0.392       8.30        0.0         7.49      12159.4      20

            V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             132.3       46884.      0.64E 07   -0.148       1.545       16.01      -0.00069     0.750       0.0
            (434.2)     (979.2)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.494   8.303   0   0.794   5   0.272 301   0.082  90   0.043  82   0.015 100   0.017 100   0.036 194   0.009 219
CN                  0.718   0.625  21   0.181 342   0.033 217   0.020 157   0.021 346   0.014 293   0.010 194   0.016 180   0.014  47
CM                 -0.018   0.047 231   0.038  69   0.030 326   0.011 246   0.011 172   0.007  62   0.005  43   0.005 285   0.006 188

DCP 1     .010      2.750   2.610 354   1.120  57   0.727   0   0.400 290   0.121 287   0.158 267   0.112 215   0.072 185   0.092 184
DCP 2     .020      2.227   2.060   4   1.005  51   0.521 353   0.266 300   0.149 280   0.137 242   0.104 701   0.114 172   0.084 130
DCP 3     .030      2.034   1.621   8   1.028  49   0.558 341   0.289 275   0.092 245   0.105 236   0.125 181   0.119 129   0.075  72
DCP 4     .049      2.089   1.667   9   0.732  30   0.313 314   0.087 257   0.061 299   0.090 211   0.058 117   0.006 284   0.042 178
DCP 5     .074      2.108   0.889  15   0.743 348   0.411 357   0.315 168   0.314 264   0.208  15   0.252 106   0.154 222   0.056  31
DCP 6     .099      1.708   1.243  15   0.541  14   0.210 288   0.052 233   0.040 252   0.071 167   0.050  75   0.013 228   0.031  86
DCP 7     .149      1.330   1.066  17   0.418 356   0.174 268   0.060 214   0.056 181   0.068  95   0.048  17   0.012 218   0.036  19
DCP 8     .200      1.109   0.977  22   0.374 354   0.165 260   0.068 207   0.064 157   0.069  93   0.042  23   0.011 313   0.027 344
DCP 9     .250      0.976   0.897  20   0.317 336   0.136 226   0.069 174   0.062 110   0.067  31   0.044 306   0.026 239   0.013 267
DCP10     .300      0.875   0.802  21   0.272 328   0.127 211   0.073 151   0.074  79   0.061 351   0.028 265   0.023 256   0.027 203
DCP11     .399      0.743   0.711  27   0.222 323   0.115 203   0.069 155   0.081  70   0.066 343   0.036 271   0.031 260   0.039 179
DCP12     .501      0.565   0.579  29   0.169 305   0.112 173   0.060 107   0.075  26   0.061 294   0.034 239   0.044 193   0.046  93
DCP13     .600      0.458   0.471  34   0.146 293   0.118 156   0.055  84   0.071 359   0.054 263   0.027 215   0.039 166   0.053  59
DCP14     .701      0.413   0.345  39   0.121 275   0.114 135   0.051  41   0.056 328   0.042 227   0.020 189   0.037 129   0.053  20
DCP15     .800      0.238   0.252  34   0.108 250   0.103 120   0.041  26   0.047 310   0.030 212   0.021 186   0.033  94   0.039 344
DCP16     .900     -0.012   0.145  24   0.089 243   0.059 124   0.018  24   0.045 294   0.027 187   0.018 150   0.026  48   0.029 300
DCP17     .969     -0.042   0.037  21   0.048 257   0.021 144   0.007 104   0.025 305   0.020 188   0.004 203   0.014  51   0.010 344
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0          45.49        0.175      0.392        8.25         0.0         9.96       12159.5       20

             V            Q            RN         CM(MIN)      CN(MAX)      ALPHA.NMAX AERO DAMP    TDR          EXT DAMP
              132.0        46741.       0.64E 07  -0.237        1.615        16.13     -0.00061     0.664         0.0
             (433.1)      (976.2)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              9.963   8.269   0   0.769   9   0.274 313   0.169 156   0.067 117   0.037  44   0.036 148   0.056 311   0.010  28
CN                 0.895   0.626  33   0.177 352   0.047 303   0.032 233   0.020 116   0.023  90   0.005 353   0.017 311   0.011 234
CM                -0.038   0.063 239   0.062  83   0.033   4   0.025 306   0.015 229   0.003 131   0.005 144   0.005 125   0.009  19

DCP 1    .010      3.219   1.347 353   1.057  78   0.746  19   0.379 351   0.192 341   0.133  33   0.185 345   0.150 263   0.032  61
DCP 2    .020      2.674   1.036  15   1.300  75   0.600  24   0.389 348   0.117 336   0.124   4   0.161 317   0.155 271   0.052 225
DCP 3    .030      2.498   0.877  21   1.161  68   0.469  13   0.241 345   0.191 350   0.129 324   0.133 284   0.110 273   0.093 240
DCP 4    .049      2.493   1.169  25   0.813  44   0.199 345   0.185   2   0.088 319   0.034 336   0.055 286   0.047 258   0.031 253
DCP 5    .074      2.391   0.777  38   0.623  14   0.246  28   0.096 241   0.387 200   0.310  25   0.179 132   0.167 238   0.129  24
DCP 6    .099      2.019   1.031  31   0.555  28   0.149 344   0.196 332   0.091 247   0.017 323   0.078 239   0.039 182   0.023 189
DCP 7    .149      1.593   0.978  29   0.428  15   0.174 334   0.197 295   0.114 230   0.021 172   0.069 193   0.037 109   0.025  96
DCP 8    .200      1.335   0.894  35   0.394  19   0.221 335   0.216 284   0.140 201   0.069 165   0.055 175   0.034 129   0.046 109
DCP 9    .250      1.145   0.852  31   0.324   4   0.198 319   0.209 255   0.138 166   0.059 127   0.067 129   0.043  81   0.059  48
DCP10    .300      1.067   0.764  33   0.276 354   0.173 305   0.183 237   0.138 148   0.062 107   0.040  67   0.041  42   0.057   5
DCP11    .399      0.923   0.763  35   0.265 341   0.132 295   0.157 232   0.129 152   0.068 116   0.050  85   0.060  39   0.068 345
DCP12    .501      0.743   0.642  32   0.223 316   0.135 294   0.124 191   0.137 116   0.065  85   0.068  32   0.078 352   0.076 281
DCP13    .600      0.619   0.637  33   0.237 295   0.116 211   0.120 153   0.101  80   0.047  35   0.094 357   0.073 318   0.092 238
DCP14    .701      0.548   0.459  33   0.238 274   0.139 178   0.133 117   0.130  37   0.094 337   0.051 300   0.052 261   0.077 189
DCP15    .800      0.357   0.344  24   0.227 260   0.142 164   0.140  99   0.137  11   0.058 299   0.050 253   0.028 212   0.065 166
DCP16    .900      0.058   0.242  11   0.145 242   0.080 147   0.084  69   0.067 327   0.025 265   0.010 262   0.024 233   0.047 140
DCP17    .969     -0.015   0.048   5   0.079 253   0.036 154   0.039  65   0.029 330   0.014 223   0.033 303   0.018 264   0.022 161


                         FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA    DEL.H      ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0          22.47        0.069      0.496        7.98         0.0        -0.00       12161.1       20

             V            Q            RN         CM(MIN)      CN(MAX)      ALPHA.NMAX AERO DAMP    TDR          EXT DAMP
              166.5        74042.       0.80E 07  -0.057        0.925        7.05      -0.00088     1.174         0.0
             (546.3)      (1546.4)
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             -0.001   7.981   0   0.097 355   0.134 318   0.043 322   0.056 333   0.019 309   0.023 265   0.045 295   0.032 275
CN                 0.162   0.756 357   0.022 316   0.026 271   0.014 289   0.010 317   0.005 329   0.001  73   0.005 319   0.004 282
CM                -0.016   0.027 321   0.005 319   0.002  43   0.003  36   0.002  66   0.002 102   0.001 144   0.001 189   0.000  29

DCP 1    .015     -0.094   4.370 351   0.008 202   0.476 311   0.261  28   0.048 347   0.078  33   0.025 252   0.111 298   0.087  25
DCP 2    .020     -0.032   3.808 353   0.475 276   0.151 284   0.174  49   0.049  13   0.065 232   0.023 245   0.058 312   0.017  29
DCP 3    .030      0.054   3.482 359   0.232 297   0.078 232   0.116  55   0.056 353   0.090 250   0.052 142   0.009  45   0.047 296
DCP 4    .049      0.245   2.911 353   0.114 346   0.091 300   0.067 330   0.087 123   0.037 173   0.027 293   0.012 223   0.030 263
DCP 5    .074      0.558   2.342 356   0.254 244   0.273 284   0.196 334   0.130  32   0.107  74   0.088 118   0.081 185   0.058 243
DCP 6    .099      0.384   2.066 353   0.139  27   0.049 177   0.073 245   0.038 311   0.012  17   0.001  17   0.012 305   0.005 320
DCP 7    .149      0.274   1.487 354   0.093  26   0.038 170   0.059 240   0.036 299   0.021   5   0.007  63   0.010 339   0.004 211
DCP 8    .200      0.226   1.189 357   0.062  24   0.022 203   0.039 254   0.033 305   0.017 359   0.011  84   0.005 286   0.007 252
DCP 9    .250      0.201   1.030 355   0.064  23   0.011 213   0.032 235   0.026 286   0.013 328   0.007 344   0.007 349   0.002 133
DCP10    .300      0.210   0.866 356   0.044  16   0.012 262   0.020 241   0.018 284   0.009 326   0.003  32   0.002 333   0.005 262
DCP11    .399      0.191   0.653   1   0.023 354   0.022 293   0.008 275   0.005 290   0.007 268   0.008 275   0.011 349   0.005 335
DCP12    .501      0.156   0.490   3   0.009 359   0.018 286   0.010 272   0.009 276   0.008 310   0.003 327   0.006 347   0.003 269
DCP13    .600      0.164   0.357   6   0.005 266   0.017 282   0.008 278   0.006 302   0.007 286   0.003 327   0.006   4   0.002 301
DCP14    .701      0.232   0.242   9   0.008 145   0.016 272   0.007 250   0.007 280   0.005 294   0.002  85   0.005 342   0.004 281
DCP15    .800      0.110   0.123  21   0.016 191   0.018 273   0.006 265   0.005 252   0.005 281   0.002 343   0.005 333   0.003 275
DCP16    .900     -0.073   0.037  93   0.031 201   0.019 238   0.007 260   0.005 272   0.006 294   0.005 321   0.006 354   0.000 329
DCP17    .969     -0.046   0.044 163   0.014 169   0.011 188   0.007 242   0.006 271   0.001 201   0.002  94   0.001  64   0.003 171
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H       ALPHA,0      TEST POINT  CYCLES ANALYSED
            0.0          22.03       0.068       0.493        7.91        0.0          2.46      12161.2       20

          V            Q            RN          CN(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR         EXT DAMP
           165.3        73305.       0.80E 07   -0.035        1.155       10.46      -0.00088      1.165       0.0
          (542.4)      (1531.0)                                    HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA            2.460   7.907   0  0.665 354  0.115 317  0.044 323  0.026 298  0.045 353  0.034 210  0.030 268  0.029 282
CN               0.377   0.743 357  0.084   3  0.047 289  0.006 176  0.012  13  0.010 308  0.002 174  0.002  13  0.003 239
CM              -0.005   0.028 326  0.007 267  0.002  88  0.001 267  0.003 166  0.002  42  0.001 336  0.002 185  0.001 161

DCP 1    .010    0.911   4.839 350  0.403  11  0.428 322  0.193 317  0.231 114  0.072 169  0.054 252  0.010 293  0.035 219
DCP 2    .020    1.049   4.169 353  0.380 335  0.145 304  0.133 281  0.097 168  0.071  82  0.048 275  0.024 312  0.044   4
DCP 3    .030    1.160   3.778 353  0.391 331  0.089 209  0.089 248  0.076 229  0.073  67  0.044 346  0.022 275  0.040 353
DCP 4    .049    1.199   3.054 353  0.365 354  0.104 291  0.193 232  0.116 199  0.127  59  0.120 359  0.084 244  0.044 146
DCP 5    .074    1.290   1.818 356  0.298 295  0.421 302  0.037  83  0.072  65  0.122 336  0.088  51  0.083 137  0.095 207
DCP 6    .099    0.971   1.872 353  0.246  15  0.097 295  0.065 188  0.036  31  0.074 330  0.026 266  0.024 183  0.015 173
DCP 7    .149    0.713   1.364 354  0.156   7  0.068 292  0.013 163  0.079  21  0.030 297  0.015 216  0.005 196  0.003 207
DCP 8    .200    0.597   1.168 357  0.130 351  0.055 253  0.035 101  0.045  11  0.036 286  0.024 205  0.006  94  0.005  31
DCP 9    .250    0.532   1.028 356  0.106 340  0.046 218  0.051  77  0.055 348  0.041 264  0.029 172  0.019  58  0.016 334
DCP10    .300    0.469   0.839 356  0.094 353  0.034 239  0.033  83  0.039 344  0.026 261  0.016 159  0.012  34  0.006 317
DCP11    .399    0.371   0.641   0  0.079  16  0.030 288  0.007 100  0.020 351  0.012 259  0.007 165  0.009   6  0.006 253
DCP12    .501    0.277   0.472   2  0.068  26  0.031 297  0.002 123  0.012 353  0.007 247  0.007 147  0.008   8  0.003 284
DCP13    .600    0.236   0.335   6  0.065  38  0.039 301  0.008 207  0.009  36  0.005 292  0.006 188  0.005 331  0.002 305
DCP14    .701    0.266   0.199  10  0.066  50  0.038 306  0.011 211  0.009  19  0.003 283  0.002 174  0.008 352  0.003 286
DCP15    .800    0.116   0.107  20  0.041  54  0.028 296  0.005 201  0.011   9  0.004 266  0.003 159  0.006 354  0.002 251
DCP16    .900   -0.082   0.036  46  0.010 261  0.015 261  0.007  25  0.009 336  0.004 204  0.006  25  0.005   3  0.003 107
DCP17    .969   -0.054   0.026 170  0.017 245  0.008 200  0.004  84  0.006 296  0.002 197  0.001 140  0.003  33  0.001  17
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                       FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K          MACH NO      DEL.ALPHA   DEL.H       ALPHA,0      TEST POINT  CYCLES ANALYSED
            0.0          22.71     [illegible]   0.492        7.86        0.0          4.85      12161.3       20

          V            Q            RN          CN(MIN)      CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR         EXT DAMP
           165.[illegible]  73041.   0.8[illegible]E 07  -0.066   1.250   1[illegible].97   -0.00091   1.193   0.0
          (54[illegible].9)  (1525.5)                              HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA            4.852   [illegible]  0.534 [illegible]  0.125 336  0.067 285  0.042 237  0.067 119  0.078  25  0.067 210  0.015 239
CN               0.567   [illegible]  0.17[illegible]  16  0.084 319  0.024 228  0.012 166  0.007 108  0.011  17  0.009 22[illegible]  0.007 21[illegible]
CM               0.005   0.070 282  0.013 138  0.018  19  0.013 209  0.007 212  0.003 166  0.003 131  0.006  24  0.002 313

DCP 1    .010    1.82[illegible]   3.684 357  1.061  63  0.663 358  0.328 280  0.157 214  0.092 178  0.021  92  0.016   9  0.024 [illegible]
DCP 2    .020    1.783   3.171 351  0.706  67  0.639   4  0.346 267  0.166 228  0.130 196  0.068 141  0.022  41  0.028  62
DCP 3    .030    1.851   2.668 35[illegible]  0.530  66  0.497   9  0.352 290  0.175 232  0.101 194  0.072 144  0.031  60  0.077  86
DCP 4    .049    1.674   2.069 352  0.681  65  0.531 [illegible]  0.332 291  0.153 224  0.038 218  0.071 191  0.056  85  0.006  47
DCP 5    .074    1.813   0.691 [illegible]  0.12[illegible] 342  0.784 328  0.267 35[illegible]  0.114 160  0.053 171  0.079  65  0.098 14[illegible]  0.059 24[illegible]
DCP 6    .099    1.332   1.342 356  0.519  69  0.278 333  0.127 261  0.066 202  0.040 135  0.020  66  0.027  19  0.021 347
DCP 7    .149    1.11[illegible]   1.087 35[illegible]  0.358  35  0.197 313  0.100 210  0.052 16[illegible]  0.035 104  0.026  92  0.038 349  0.019 284
DCP 8    .200    0.836   0.926   2  0.286  31  0.151 305  0.077 218  0.060 194  0.029 104  0.027  46  0.038 355  0.021 285
DCP 9    .250    0.750   0.839   7  0.258  19  0.143 286  0.090 193  0.359 127  0.046  67  0.046  10  0.030 295  0.031  75
DCP10    .300    0.664   0.701   2  0.211  17  0.109 277  0.063 182  0.036 139  0.030  74  0.039   8  0.026 283  0.027 225
DCP11    .399    0.531   0.553   7  0.170  24  0.081 282  0.050 173  0.024  61  0.018  48  0.023   8  0.022 250  0.014 212
DCP12    .50[illegible]    0.421   0.418  10  0.136  23  0.063 269  0.018 151  0.028  49  0.007 341  0.012 356  0.020 224  0.017 151
DCP13    .600    0.325   0.298  15  0.114  25  0.051 264  0.035 189  0.021  83  0.007 327  0.011 343  0.025 210  0.018 150
DCP14    .70[illegible]    0.323   0.176  26  0.096  33  0.043 296  0.031 119  0.019  15  0.039 299  0.007 333  0.021 201  0.004 173
DCP15    .800    0.159   0.128  76  0.052   5  0.036 221  0.031 101  0.016   4  0.005 310  0.009 309  0.022 189  0.007 106
DCP16    .90[illegible]   -0.358   0.342  19  0.347 298  0.063 197  0.022  95  0.013  32  0.011 348  0.011 269  0.020 174  0.006  51
DCP17    .969   [illegible]  [illegible]  0.036 27[illegible]  0.02[illegible] 202  0.009 122  0.0[illegible]  69  0.008   3  0.007 286  0.018 185  0.005 107
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                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        22.64      0.070      0.491      7.82        0.0         7.45      12161.4      20

               V          Q          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX ALPHA DAMP TDR         EXT DAMP
                164.3      72778.     0.80E 07  -0.098      1.328       12.94     -0.00114    1.494       0.0
               (539.2)    (1520.0)
                                                               HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             7.453    7.817   0   0.676   2   0.174 338   0.076   3   0.122 343   0.103 298   0.076 199   0.011 143   0.045 300
CN                0.695    0.413  11   0.214  42   0.064 348   0.048 347   0.022 283   0.007 268   0.007 198   0.011 118   0.007 335
CM               -0.014    0.034 233   0.028 127   0.014  28   0.007  50   0.010 359   0.004 263   0.003 308   0.004 267   0.002 155

DCP 1   .010      2.578    2.079 341   1.497  76   0.575  24   0.275  20   0.239 334   0.112 299   0.066 286   0.033 313   0.004 271
DCP 2   .020      2.360    1.883 345   1.271  82   0.621  22   0.174  17   0.275 354   0.150 293   0.082 310   0.048 285   0.041 280
DCP 3   .030      2.355    1.786 346   1.000  83   0.552  25   0.126   0   0.234  11   0.174 303   0.074 310   0.072 275   0.038 281
DCP 4   .049      2.021    1.080 351   1.028  72   0.368  19   0.176  32   0.197 359   0.106 310   0.078 336   0.067 288   0.026 278
DCP 5   .074      2.145    0.280  48   0.254  80   0.558 332   0.428  15   0.171  25   0.071   1   0.013  71   0.070 207   0.086 229
DCP 6   .099      1.617    0.751   3   0.660  58   0.177   7   0.116  11   0.094 317   0.049 265   0.024 265   0.023 239   0.019 167
DCP 7   .149      1.265    0.710   8   0.462  45   0.127 349   0.094 355   0.083 292   0.039 240   0.013 235   0.011 201   0.006 113
DCP 8   .200      1.054    0.648  12   0.371  44   0.104 356   0.088 346   0.079 283   0.044 231   0.027 205   0.017 141   0.022  82
DCP 9   .250      0.958    0.628  11   0.310  33   0.097 344   0.086 320   0.067 253   0.034 206   0.028 173   0.040 115   0.028  36
DCP10   .300      0.850    0.553  12   0.252  27   0.067 341   0.069 318   0.052 244   0.017 205   0.022 182   0.031 111   0.019  23
DCP11   .399      0.691    0.464  18   0.205  26   0.039 328   0.048 328   0.041 247   0.010 203   0.020 188   0.033 116   0.020  16
DCP12   .501      0.535    0.375  21   0.164  17   0.027 297   0.035 316   0.036 222   0.011 121   0.015 185   0.027 106   0.015   6
DCP13   .600      0.430    0.294  27   0.140  10   0.030 255   0.017 312   0.027 202   0.012  90   0.007 147   0.017  80   0.015 317
DCP14   .701      0.398    0.196  37   0.109   1   0.036 212   0.007 340   0.023 181   0.015  70   0.005 154   0.015  74   0.013 300
DCP15   .800      0.223    0.174  33   0.091 336   0.036 221   0.015 253   0.030 173   0.017  89   0.010  88   0.011  63   0.009 302
DCP16   .900     -0.019    0.128  20   0.066 308   0.019 241   0.023 228   0.020 141   0.004  80   0.012  93   0.006  65   0.005 274
DCP17   .969     -0.048    0.038  23   0.037 294   0.009 271   0.017 248   0.010 150   0.004  67   0.003  59   0.007 154   0.003 318
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                         FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

               TUNED HZ   DRIVE HZ   K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.0    TEST POINT  CYCLES ANALYSED
                0.0        45.31      0.139      0.494      8.41        0.0        -0.01      12163.1      20

               V          Q          RN         CN(MIN)    CN(MAX)     ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                166.0      73846.     0.80E 07  -0.071      0.853        8.36     -0.00082    1.106       0.0
               (544.6)    (1542.3)
                                                               HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            -0.006    8.410   0   0.746 354   0.192 306   0.014  15   0.009 176   0.013  24   0.030 217   0.013 284   0.008 314
CN                0.151    0.725 358   0.034  28   0.008 247   0.014 306   0.009 266   0.005 298   0.002 245   0.003 159   0.004 197
CM               -0.016    0.038 300   0.010 297   0.003 317   0.003 227   0.003 340   0.001 355   0.002  85   0.001  30   0.000 118

DCP 1   .010     -0.278    4.218 346   0.632 251   0.455 286   0.269 346   0.105 298   0.096 322   0.041  62   0.056 218   0.049 308
DCP 2   .020     -0.081    3.603 350   0.349 278   0.174 280   0.144  16   0.063 325   0.076 228   0.047 135   0.010 225   0.041 260
DCP 3   .030.     0.032    3.150 350   0.148 306   0.149 287   0.091 355   0.017  65   0.085 223   0.031  95   0.067  42   0.075 246
DCP 4   .049      0.236    2.066 350   0.136 357   0.066 252   0.089 305   0.044  60   0.021 105   0.018 228   0.028 155   0.038 167
DCP 5   .074      0.526    2.018 351   0.057 288   0.131 228   0.235 264   0.234 326   0.188  30   0.106  90   0.075 102   0.128 134
DCP 6   .099      0.372    1.985 350   0.187  23   0.041 130   0.061 229   0.041 265   0.019 301   0.006 177   0.011 223   0.013 270
DCP 7   .149      0.255    1.438 351   0.144  21   0.036 100   0.037 207   0.032 232   0.023 281   0.010 280   0.009 280   0.003  34
DCP 8   .200      0.214    1.139 357   0.099  26   0.017  82   0.023 235   0.028 245   0.020 282   0.011 295   0.002 308   0.007   7
DCP 9   .250      0.193    0.996 355   0.097  27   0.026  71   0.015 167   0.026 211   0.017 267   0.011 268   0.003 331   0.003 287
DCP10   .300      0.197    0.822 356   0.074  29   0.014  43   0.004 156   0.015 192   0.009 249   0.007 232   0.002 235   0.010 270
DCP11   .399      0.187    0.636   6   0.042  48   0.009 334   0.015 359   0.007 207   0.006 236   0.009 262   0.001 180   0.003 275
DCP12   .901      0.149    0.480  11   0.036  61   0.004 292   0.011 353   0.007 204   0.004 273   0.008 312   0.001 300   0.004 170
DCP13   .600      0.152    0.359  17   0.031  92   0.006 223   0.012 349   0.004 195   0.003 206   0.008 270   0.002 222   0.001 202
DCP14   .701      0.227    0.248  23   0.035  94   0.008 198   0.011   4   0.004 173   0.002 221   0.004 262   0.004 178   0.005 208
DCP15   .800      0.105    0.146  38   0.030 118   0.009 185   0.009   6   0.004 179   0.006 164   0.003 256   0.005 147   0.001 194
DCP16   .900     -0.074    0.073  88   0.031 155   0.014 177   0.012  11   0.004 166   0.003 170   0.007 247   0.006 180   0.003 218
DCP17   .969     -0.042    0.049 155   0.021 148   0.014 183   0.006   0   0.009 198   0.003 130   0.004 177   0.009 224   0.003  28
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ    DRIVE HZ     K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         45.09        0.139        0.493       8.44        0.0           2.30       12163.2       20

               V.           Q            RN           CN(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                165.3        73444.       0.80E 07    -0.049       1.081       10.86       -0.00083      1.115        0.0
               (542.3)      (1533.9)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.300    8.445   0   0.738 353   0.201 313   0.071   2   0.017 222   0.026  50   0.011 271   0.035 221   0.013 227
CN                 0.363    0.709 357   0.064 356   0.009 266   0.020  22   0.010 259   0.005  56   0.007 297   0.004 216   0.002  70
CM                -0.005    0.040 303   0.008 255   0.003  48   0.008 226   0.001  57   0.001 263   0.001 116   0.001 215   0.000  19

DCP 1     .010     0.724    4.587 343   0.303 338   0.212 300   0.097 287   0.104  13   0.013 105   0.033  20   0.026 261   0.022  92
DCP 2     .020     1.006    3.969 349   0.313 309   0.028 278   0.071 269   0.022 123   0.028 344   0.008 101   0.017 260   0.049 211
DCP 3     .030     1.103    3.563 348   0.284 307   0.069 136   0.041 228   0.024 163   0.036 330   0.030 251   0.005 247   0.039 210
DCP 4     .049     1.226    3.004 349   0.283 312   0.053 171   0.029 180   0.029 184   0.032 327   0.047 256   0.003 162   0.006 265
DCP 5     .074     1.225    1.965 349   0.337 315   0.018 170   0.089 185   0.124 298   0.060 346   0.033 105   0.047 209   0.069   3
DCP 6     .099     0.951    1.767 351   0.187 357   0.061 276   0.017  96   0.022 358   0.034 247   0.019 190   0.009 345   0.005 351
DCP 7     .149     0.674    1.263 352   0.115   7   0.043 304   0.030 294   0.002 249   0.003 340   0.011 255   0.009 180   0.007  68
DCP 8     .200     0.572    1.089 357   0.062 344   0.021  74   0.058 334   0.026 230   0.018 105   0.017 313   0.008 243   0.002 152
DCP 9     .250     0.498    0.974 354   0.053 354   0.031  60   0.069 349   0.053 216   0.044  99   0.038 338   0.033 232   0.021 121
DCP10     .300     0.444    0.796 356   0.070   8   0.010  23   0.035 354   0.020 220   0.019  72   0.012 312   0.015 190   0.009  48
DCP11     .399     0.363    0.622   6   0.072  23   0.009 328   0.034  42   0.009 256   0.008 101   0.011 311   0.009 197   0.007  78
DCP12     .501     0.271    0.468  11   0.058  29   0.013 263   0.026  41   0.007 296   0.002  67   0.006 278   0.005 105   0.004 317
DCP13     .600     0.231    0.347  17   0.054  30   0.016 254   0.029  55   0.007 285   0.001  81   0.005 292   0.001  16   0.004 105
DCP14     .701     0.269    0.222  27   0.056  38   0.017 258   0.025  56   0.007 296   0.002  84   0.005 314   0.003  41   0.004 199
DCP15     .800     0.119    0.134  43   0.037  44   0.016 240   0.026  52   0.006 290   0.003 115   0.005 309   0.006 348   0.003 210
DCP16     .900    -0.087    0.058  71   0.009 259   0.014 198   0.033  33   0.009 221   0.004  10   0.007 269   0.001 335   0.005 249
DCP17     .969    -0.055    0.039 169   0.008 240   0.010 177   0.015  38   0.006 165   0.004 326   0.005 188   0.004  51   0.000  33
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                          FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

               TUNED HZ    DRIVE HZ     K            MACH NO     DEL.ALPHA   DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                0.0         45.10        0.139        0.491       8.34        0.0           4.93       12163.3       20

               V            Q            RN           CN(MIN)     CN(MAX)     ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                164.7        73142.       0.80E 07    -0.088       1.297       13.34       -0.00066      0.891        0.0
               (540.4)      (1527.6)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              4.932    8.343   0   0.806   3   0.339 312   0.158  42   0.036 304   0.020 354   0.029  91   0.058 195   0.026 200
CN                 0.921    0.629  10   0.180 353   0.052 236   0.017  64   0.021 329   0.011 287   0.013 162   0.004  67   0.003  36
CM                -0.010    0.033 261   0.021  60   0.026 327   0.021 202   0.006 124   0.004  61   0.006 351   0.002 224   0.001 145

DCP 1     .010     1.496    3.459 348   1.023  38   0.635 334   0.354 223   0.130 134   0.066 289   0.025 185   0.030 101   0.027 292
DCP 2     .020     1.503    2.889 355   0.803  35   0.553 337   0.348 249   0.153 166   0.037 323   0.085 178   0.077  80   0.052 309
DCP 3     .030     1.529    2.483 356   0.712  27   0.445 328   0.251 253   0.147 191   0.056 127   0.033 115   0.056  80   0.049 342
DCP 4     .049     1.493    1.939 359   0.744  30   0.452 319   0.188 235   0.056 223   0.080 204   0.087 121   0.052  56   0.031 312
DCP 5     .074     1.661    1.165   5   0.521   1   0.351 306   0.301 226   0.207 308   0.119  33   0.153 104   0.078  22   0.085  54
DCP 6     .099     1.281    1.383   3   0.520  17   0.256 293   0.128 185   0.034  61   0.004 258   0.038  61   0.045 326   0.040 250
DCP 7     .149     0.993    1.158   5   0.384 356   0.185 260   0.120 154   0.041  51   0.018  28   0.034 349   0.050 262   0.038 179
DCP 8     .200     0.826    1.014  11   0.324 353   0.153 250   0.105 150   0.038  55   0.021  27   0.033 346   0.048 254   0.032 179
DCP 9     .250     0.735    0.922   8   0.279 337   0.147 214   0.099  94   0.061   6   0.030 312   0.023 275   0.041 213   0.029 137
DCP10     .300     0.659    0.785   9   0.230 331   0.120 199   0.082  76   0.050 350   0.025 293   0.019 240   0.027 177   0.018 101
DCP11     .399     0.541    0.646  18   0.184 337   0.107 199   0.073  73   0.042   5   0.030 321   0.036 241   0.032 161   0.025  75
DCP12     .501     0.404    0.505  22   0.140 330   0.094 179   0.077  53   0.043 335   0.029 279   0.039 201   0.029 117   0.025  37
DCP13     .600     0.322    0.383  29   0.104 331   0.081 165   0.072  30   0.034 309   0.020 255   0.032 174   0.029  42   0.023 330
DCP14     .701     0.325    0.262  39   0.075 327   0.074 145   0.077  10   0.030 272   0.013 225   0.029 156   0.027  34   0.016 292
DCP15     .800     0.164    0.188  40   0.057 295   0.069 139   0.068   1   0.021 267   0.010 221   0.021 138   0.019   7   0.009 250
DCP16     .900    -0.058    0.101  29   0.061 257   0.050 133   0.054 350   0.015 280   0.016 208   0.019  93   0.015 319   0.001 226
DCP17     .969    -0.053    0.012  58   0.041 258   0.029 142   0.037 356   0.010 296   0.011 216   0.009 102   0.006 357   0.003 230
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                         FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0          45.39        0.141        0.490        8.27         0.0          7.30        12163.4       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
               164.0        72543.       0.00E 07    -0.174        1.576        15.49       -0.00075      1.003        0.0
              (538.2)      (1515.1)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                7.297      8.274   0    0.752  11    0.325 324    0.261 172    0.061 132    0.054  56    0.022 184    0.012 341    0.004 145
CN                   0.674      0.559  24    0.224   2    0.056 270    0.046 203    0.030 131    0.025  37    0.013 328    0.009 286    0.004 155
CM                  -0.021      0.052 231    0.039  98    0.025   0    0.017 340    0.017 267    0.011 184    0.008 121    0.004  51    0.003  11

DCP 1      .010      2.208      2.161 351    1.277  54    0.638 342    0.109 249    0.094 354    0.104 261    0.065 188    0.041 176    0.019 102
DCP 2      .020      2.088      1.958   2    1.073  56    0.580 354    0.194 282    0.043 347    0.113 268    0.042 157    0.073 286    0.077 195
DCP 3      .030      1.981      1.636   2    0.897  55    0.444   2    0.211 317    0.098 278    0.088 260    0.071 202    0.034 215    0.062 171
DCP 4      .049      1.886      1.297  10    0.885  48    0.332 343    0.093 348    0.115 316    0.094 255    0.053 202    0.022 205    0.036 192
DCP 5      .074      2.021      0.644  28    0.598  14    0.393 348    0.052 236    0.241 299    0.043 353    0.076 165    0.054 309    0.148  78
DCP 6      .099      1.562      0.986  18    0.621  34    0.206 319    0.047 309    0.070 268    0.060 187    0.026 108    0.007 207    0.031 126
DCP 7      .149      1.225      0.929  20    0.461  13    0.157 291    0.044 279    0.078 222    0.066 137    0.035  55    0.013  31    0.026  35
DCP 8      .200      1.020      0.852  25    0.398  12    0.137 291    0.062 261    0.082 202    0.059 123    0.023  50    0.019  61    0.022  21
DCP 9      .250      0.932      0.812  23    0.367 356    0.130 272    0.093 228    0.110 178    0.080 102    0.037  54    0.042  38    0.036 345
DCP10      .300      0.830      0.719  24    0.310 349    0.106 258    0.085 212    0.094 155    0.064  74    0.027  16    0.026  15    0.023 324
DCP11      .399      0.698      0.641  31    0.249 348    0.081 251    0.086 215    0.094 155    0.072  75    0.040  15    0.030 351    0.024 289
DCP12      .501      0.543      0.544  33    0.206 336    0.076 229    0.083 197    0.086 128    0.066  45    0.040 344    0.026 300    0.020 246
DCP13      .600      0.437      0.450  37    0.174 326    0.076 206    0.071 182    0.076 107    0.061  19    0.034 323    0.030 286    0.027 213
DCP14      .701      0.414      0.339  43    0.145 310    0.084 177    0.058 156    0.071  76    0.058 347    0.036 290    0.030 231    0.022 163
DCP15      .800      0.241      0.271  37    0.135 289    0.086 173    0.061 146    0.067  63    0.054 338    0.035 274    0.027 208    0.017 136
DCP16      .900     -0.015      0.163  24    0.099 273    0.051 176    0.060 144    0.054  43    0.036 314    0.026 253    0.020 181    0.014 117
DCP17      .969     -0.048      0.046  26    0.054 281    0.022 200    0.038 161    0.029  57    0.016 337    0.019 285    0.014 199    0.006 151
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                         FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

              TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
               0.0          22.20        0.057        0.592        7.95         0.0         -0.02        12165.1       20

              V            Q            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
               197.0        103168.      0.94E 07    -0.060        1.005        8.01        -0.00101      1.991        0.0
              (646.4)      (2154.7)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               -0.023      7.951   0    0.738 353    0.167 322    0.074 318    0.063 323    0.026 315    0.061 301    0.026   4    0.035 255
CN                   0.166      0.806 357    0.028 320    0.039 265    0.008 274    0.009 343    0.006 319    0.004 329    0.004 108    0.003 198
CM                  -0.015      0.036 328    0.008 275    0.001 101    0.004  26    0.002  80    0.002  87    0.001  72    0.003 257    0.001 129

DCP 1      .010     -0.380      3.803 351    0.559 258    0.566 317    0.046 351    0.153 285    0.150   9    0.026 302    0.116 320    0.089  14
DCP 2      .020     -0.189      3.437 354    0.393 266    0.378 317    0.105  46    0.079 282    0.123   8    0.052  63    0.068 304    0.091  68
DCP 3      .030     -0.055      3.228 353    0.169 282    0.228 306    0.106  32    0.020  12    0.043  17    0.048  82    0.052 237    0.026  78
DCP 4      .049      0.253      2.981 353    0.073 329    0.160 307    0.068  16    0.054 101    0.040 221    0.027 114    0.046 231    0.001 113
DCP 5      .074      0.562      2.545 355    0.154 217    0.257 258    0.214 300    0.136   9    0.102  33    0.149  84    0.134 138    0.126 192
DCP 6      .099      0.588      2.560 353    0.126 302    0.049 243    0.066 283    0.099 122    0.036 165    0.017 212    0.007  98    0.032 263
DCP 7      .149      0.437      1.956 355    0.211 293    0.192 193    0.028  98    0.083 114    0.082  70    0.115 317    0.067 230    0.023 163
DCP 8      .200      0.228      1.300 357    0.081   3    0.086 216    0.023 118    0.057   7    0.021 247    0.014 260    0.024 267    0.017 144
DCP 9      .250      0.206      1.144 355    0.075 358    0.058 186    0.023  89    0.058 325    0.047 251    0.010 226    0.025  46    0.005 112
DCP10      .300      0.196      0.915 356    0.070  13    0.028 189    0.014  93    0.056 313    0.037 245    0.015 147    0.024  22    0.007 290
DCP11      .399      0.173      0.667   1    0.051  41    0.028 307    0.022 252    0.017 291    0.015 278    0.006 283    0.013  64    0.003 311
DCP12      .501      0.145      0.487   3    0.032  43    0.032 300    0.019 245    0.011 287    0.007 302    0.005 281    0.007  57    0.003 301
DCP13      .600      0.157      0.343   7    0.019  53    0.031 303    0.015 233    0.007 265    0.008 310    0.003 248    0.009  90    0.005 314
DCP14      .701      0.234      0.209  13    0.027  82    0.031 300    0.016 232    0.003 230    0.007 320    0.004 301    0.010  98    0.001 189
DCP15      .800      0.106      0.099  31    0.012 133    0.023 282    0.013 222    0.005 266    0.007 324    0.003 302    0.013  93    0.002 216
DCP16      .900     -0.081      0.049 118    0.027 205    0.015 237    0.015 198    0.005 253    0.004 300    0.005 230    0.010  84    0.003 274
DCP17      .969     -0.043      0.050 164    0.011 181    0.015 179    0.006 191    0.007 242    0.005 251    0.004 293    0.010  97    0.001 220
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0         22.81       0.059       0.590       7.94        0.0         2.45       12165.2      20

            V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
             196.1       102555.     0.94E 07   -0.045       1.153       9.92      -0.00101     1.575        0.0
            (643.4)     (2141.9)                           HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               2.451   7.941   0   0.609 358   0.099 330   0.025 302   0.031 299   0.036 130   0.036   6   0.026 167   0.005 220
CN                  0.358   0.731 357   0.122  33   0.075 310   0.040 253   0.012 198   0.015  58   0.010  18   0.032 124   0.006 219
CM                 -0.008   0.034 322   0.003 146   0.008  55   0.005 294   0.003 225   0.003 160   0.002 101   0.002 325   0.001 287

DCP 1     .010      0.391   4.062 349   0.439  39   0.503 321   0.258   3   0.157  78   0.059 160   0.039 102   0.038 161   0.047 202
DCP 2     .020      0.566   3.628 352   0.405  35   0.258 319   0.144 348   0.135  94   0.104 166   0.049 231   0.020 315   0.044 241
DCP 3     .030      0.707   3.209 351   0.428  37   0.127 333   0.081 288   0.033 151   0.056 154   0.022 265   0.052 336   0.028 283
DCP 4     .049      0.942   2.759 351   0.455  50   0.156 354   0.138 268   0.075 244   0.065 123   0.033 346   0.062 316   0.028 299
DCP 5     .074      1.160   2.178 353   0.276  76   0.253 322   0.310 281   0.141 296   0.132  58   0.142  69   0.069 147   0.077 205
DCP 6     .099      1.099   2.094 351   0.380  60   0.329 357   0.247 259   0.112 237   0.016 194   0.049  48   0.011 215   0.008  84
DCP 7     .149      0.824   1.578 355   0.247  24   0.214 337   0.222 253   0.102 184   0.018 246   0.070 125   0.049  55   0.013 111
DCP 8     .200      0.605   1.213   0   0.221   6   0.103 291   0.065 243   0.069 183   0.056  85   0.036  21   0.014 348   0.014 288
DCP 9     .250      0.528   1.029 358   0.177   6   0.100 283   0.060 224   0.064 147   0.063  62   0.037 352   0.012 324   0.021 281
DCP10     .300      0.462   0.835 359   0.162   7   0.093 271   0.042 195   0.041 126   0.048  54   0.037 348   0.017 291   0.021 239
DCP11     .399      0.363   0.627   3   0.119  25   0.069 283   0.025 178   0.024  80   0.024  22   0.018 323   0.009 227   0.012 221
DCP12     .501      0.270   0.455   5   0.097  32   0.053 292   0.013 188   0.015  63   0.013   5   0.010 299   0.007 169   0.005 183
DCP13     .600      0.228   0.310  10   0.083  42   0.050 295   0.008 199   0.013  40   0.009 350   0.007 277   0.010 156   0.005 136
DCP14     .701      0.260   0.160  18   0.086  55   0.042 306   0.006 249   0.007  18   0.008 291   0.003 241   0.008 116   0.004  89
DCP15     .800      0.118   0.098  30   0.034  41   0.032 277   0.002 134   0.009  34   0.009 345   0.005 273   0.010 131   0.004 110
DCP16     .900     -0.083   0.036  61   0.024 261   0.030 246   0.001 164   0.006  51   0.011   0   0.007 300   0.010 132   0.002 140
DCP17     .969     -0.054   0.034 159   0.019 267   0.017 222   0.004 149   0.002 316   0.003  46   0.005  14   0.006 121   0.004 126
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0         22.36       0.058       0.589       7.85        0.0         4.97       12165.3      20

            V           Q           RN          CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
             195.3       103192.     0.93E 07   -0.060       1.232       10.88     -0.00103     1.605        0.0
            (640.9)     (2155.2)                           HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               4.965   7.852   0   0.631   3   0.146 337   0.067   0   0.099 330   0.094 299   0.124 174   0.047 346   0.039 312
CN                  0.536   0.561   0   0.192  47   0.088 349   0.069 319   0.024 269   0.015 241   0.015 172   0.006  54   0.001 350
CM                 -0.008   0.023 269   0.018 127   0.013  22   0.003   0   0.005 348   0.004 269   0.003 254   0.004 180   0.001 121

DCP 1     .010      1.285   3.445 347   1.050  52   0.204  39   0.057 352   0.101 286   0.037 234   0.025 221   0.025 339   0.038 344
DCP 2     .020      1.509   2.863 351   0.631  54   0.233   9   0.133 354   0.069 305   0.067 235   0.030 190   0.012 182   0.009  59
DCP 3     .030      1.515   2.454 350   0.573  58   0.237  15   0.129 344   0.059 311   0.070 253   0.056 205   0.026 170   0.036  56
DCP 4     .049      1.486   1.789 347   0.779  74   0.379  15   0.171 333   0.051 298   0.076 293   0.076 210   0.025 152   0.032  87
DCP 5     .074      1.790   0.923 350   0.393 102   0.623 338   0.315 354   0.113 357   0.103 336   0.091 128   0.130 144   0.079 207
DCP 6     .099      1.450   1.316 348   0.787  74   0.413 359   0.114 358   0.154 324   0.077 280   0.058 239   0.004 337   0.011 235
DCP 7     .149      1.069   1.056   0   0.512  55   0.315 357   0.133 324   0.158 312   0.103 249   0.054 279   0.071 227   0.014 275
DCP 8     .200      0.851   0.920   4   0.335  44   0.174   3   0.165 311   0.082 255   0.059 234   0.046 186   0.017 168   0.020 114
DCP 9     .250      0.778   0.847   1   0.260  39   0.159 355   0.134 290   0.063 224   0.045 224   0.048 165   0.011  77   0.022 114
DCP10     .300      0.683   0.705   2   0.221  34   0.116 349   0.106 286   0.059 212   0.031 205   0.047 159   0.031  79   0.025  94
DCP11     .399      0.544   0.562   7   0.168  31   0.052 330   0.045 286   0.037 206   0.016 155   0.020 136   0.025  42   0.012  10
DCP12     .501      0.407   0.419  10   0.134  75   0.028 296   0.013 294   0.013 193   0.000 151   0.011 161   0.021  25   0.009 289
DCP13     .600      0.325   0.296  16   0.113  23   0.025 268   0.005 350   0.010 204   0.005  93   0.005 119   0.016  19   0.009 321
DCP14     .701      0.324   0.167  27   0.088  23   0.022 220   0.012  49   0.007 218   0.010  91   0.006  10   0.013 350   0.005 275
DCP15     .800      0.157   0.130  30   0.060 356   0.028 227   0.001 149   0.011 185   0.010 100   0.007  55   0.013 342   0.006 270
DCP16     .900     -0.063   0.094  20   0.050 299   0.024 221   0.004 243   0.008 186   0.009 153   0.012  97   0.012 345   0.004 283
DCP17     .969     -0.054   0.012  62   0.033 284   0.011 231   0.006 270   0.005 218   0.006 153   0.006  94   0.008 336   0.005 260
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                                  FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ      DRIVE HZ      K              MACH NO        DEL.ALPHA      DEL.H         ALPHA.O        TEST POINT    CYCLES ANALYSED
                   0.0           22.37        0.058          0.594          7.03          0.0           -0.03          12167.1        20

                  V             Q             RN             CN(MIN)        CN(MAX)        ALPHA,NMAX    AERO DAMP      TDR           EXT DAMP
                   197.8         103689.      0.94E 07       -0.087         1.328          7.78         -0.00139        2.185         0.0
                  (648.9)       (2165.6)
                                                                     HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA               -0.033    7.054   0     0.570 358     0.142 333     0.048 334     0.008  76     0.062  97     0.110 345     0.040  27     0.018 166
CN                   0.172    1.062 358     0.073   9     0.114 260     0.028 249     0.025  29     0.005  32     0.011 336     0.009 348     0.007 105
CM                  -0.027    0.034 304     0.006 172     0.018   0     0.014 332     0.001 211     0.005  96     0.004  94     0.002 255     0.002 276

DCP 1     .010      -0.959    3.954 352     0.429 272     0.621 302     0.138 316     0.249 308     0.052  12     0.074 292     0.064 304     0.025 270
DCP 2     .020      -0.744    3.570 353     0.287 277     0.581 300     0.185 342     0.232 333     0.083  29     0.027 298     0.043 316     0.031 267
DCP 3     .030      -0.559    3.369 353     0.138 297     0.516 300     0.182   5     0.179 326     0.098 353     0.063 338     0.076 353     0.016  37
DCP 4     .049      -0.236    3.307 352     0.218  39     0.395 302     0.169   3     0.154 328     0.124   6     0.058  58     0.023 351     0.021  15
DCP 5     .074       0.533    2.202 352     0.420 265     0.650 314     0.220   7     0.258 327     0.314  26     0.211  97     0.031 203     0.005  54
DCP 6     .099       0.279    2.988 352     0.289  56     0.324 296     0.212   0     0.100  28     0.034  31     0.070  56     0.031 125     0.041  24
DCP 7     .149       0.422    2.682 353     0.221  66     0.213 278     0.143 319     0.124  57     0.111 182     0.024   9     0.063 152     0.020 199
DCP 8     .200       0.479    2.317 357     0.137  98     0.227 263     0.232 277     0.194  91     0.166 195     0.085 287     0.017 343     0.044 130
DCP 9     .250       0.416    1.825 356     0.148  29     0.171 290     0.293 229     0.137 112     0.039 196     0.030  97     0.084 343     0.052 198
DCP10     .300       0.315    1.447 359     0.221   2     0.130 241     0.174 232     0.099 158     0.079 105     0.015  15     0.082 350     0.028 263
DCP11     .399       0.224    1.021   3     0.155   2     0.117 205     0.053 203     0.015 260     0.056  80     0.039 296     0.029 301     0.012  27
DCP12     .501       0.189    0.704   6     0.113 352     0.100 219     0.072 158     0.023 347     0.034  16     0.026 312     0.027 253     0.011 159
DCP13     .600       0.193    0.462  11     0.067 355     0.073 234     0.063 140     0.023   1     0.038 320     0.022 312     0.013 192     0.020 151
DCP14     .701       0.282    0.248  19     0.059  49     0.095 241     0.039 139     0.028 350     0.039 282     0.012 241     0.015  94     0.015  79
DCP15     .800       0.123    0.138  32     0.008 332     0.054 227     0.027 126     0.022 358     0.028 269     0.006 222     0.017  68     0.008  36
DCP16     .900      -0.113    0.050  87     0.056 241     0.053 210     0.026 106     0.016 346     0.026 268     0.007 284     0.016  75     0.008  60
DCP17     .969      -0.064    0.048 166     0.009 197     0.026 196     0.011 154     0.004 118     0.005 247     0.011 273     0.009  82     0.009  47


                                  FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ      DRIVE HZ      K              MACH NO        DEL.ALPHA      DEL.H         ALPHA.O        TEST POINT    CYCLES ANALYSED
                   0.0           22.48        0.058          0.592          7.07          0.0            2.45          12167.2        20

                  V             Q             RN             CN(MIN)        CN(MAX)        ALPHA,NMAX    AERO DAMP      TDR           EXT DAMP
                   196.6         102536.      0.94E 07       -0.088         1.404          9.13         -0.00168        2.631         0.0
                  (645.0)       (2141.5)
                                                                     HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA                2.449    7.868   0     0.629   4     0.135 332     0.080  19     0.106 320     0.025 278     0.081 197     0.021  50     0.043 330
CN                   0.417    0.963 358     0.233  27     0.092 327     0.063 264     0.026 213     0.005  46     0.005 195     0.008  86     0.011 359
CM                  -0.025    0.036 287     0.018 123     0.014  59     0.008  58     0.008 351     0.005 252     0.002 222     0.005 224     0.003 134

DCP 1     .010      -0.027    4.113 349     0.593  23     0.449 321     0.238   8     0.046  64     0.100 334     0.068  79     0.030  27     0.046  20
DCP 2     .020       0.042    3.808 351     0.606  28     0.284 321     0.216  18     0.089  94     0.043   9     0.069  80     0.036  94     0.021   6
DCP 3     .030       0.187    3.507 351     0.661  33     0.156 317     0.191  25     0.131 101     0.018  80     0.058  83     0.051 122     0.016 271
DCP 4     .049       0.537    3.201 350     0.743  41     0.063 329     0.157  30     0.139  93     0.047 160     0.008 105     0.042 127     0.052 223
DCP 5     .074       1.260    2.839 349     0.358 339     0.362 335     0.195  36     0.100  23     0.165  61     0.145 136     0.056 203     0.041 195
DCP 6     .099       0.947    2.800 349     0.792  44     0.084  68     0.010  91     0.069  95     0.081 135     0.099 231     0.074 301     0.017 172
DCP 7     .149       0.949    2.453 349     0.710  45     0.173  29     0.157 197     0.100 253     0.050  66     0.111 245     0.117 291     0.081 330
DCP 8     .200       0.838    1.843 351     0.634  56     0.340   0     0.246 222     0.238 270     0.093 304     0.072   0     0.055 107     0.055 324
DCP 9     .250       0.734    1.403 357     0.413  40     0.311 340     0.117 252     0.166 279     0.113 248     0.059 317     0.085 162     0.038  43
DCP10     .300       0.668    1.128   2     0.260  22     0.239 337     0.158 262     0.083 262     0.100 293     0.025 195     0.055 155     0.062 100
DCP11     .399       0.513    0.864   7     0.153   6     0.113 323     0.107 290     0.049 155     0.015 313     0.031 165     0.016 102     0.033  97
DCP12     .501       0.383    0.669  10     0.159 358     0.075 290     0.062 288     0.050 177     0.014  84     0.024 148     0.034  73     0.024  25
DCP13     .600       0.314    0.483  15     0.152   1     0.069 271     0.035 261     0.048 177     0.031  93     0.014  98     0.035  49     0.029 343
DCP14     .701       0.347    0.264  24     0.119   0     0.057 245     0.012 204     0.033 162     0.034  74     0.014  24     0.026  25     0.030 308
DCP15     .800       0.155    0.162  29     0.086 344     0.059 239     0.023 185     0.026 152     0.028  65     0.013 355     0.011 357     0.015 272
DCP16     .900      -0.115    0.093  30     0.069 301     0.046 234     0.030 205     0.025 152     0.025  63     0.008  11     0.011   1     0.016 259
DCP17     .969      -0.072    0.024 153     0.029 300     0.017 226     0.016 228     0.015 180     0.015  89     0.003  77     0.007  42     0.007 271
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ  DRIVE HZ  K         MACH NO   DEL.ALPHA  DEL.H     ALPHA.0    TEST POINT  CYCLES ANALYSED
                  0.0       22.13     0.057     0.591     7.72       0.0       4.65       12167.3     20

                V         Q         RN        CN(MIN)   CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                 196.0    101741.   0.93E 07  -0.111    1.553      9.91       -0.00195   3.039       0.0
                (642.9)   (2124.9)
                                                   HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             4.050   7.716   0  0.637   5  0.006 331  0.046  27  0.070  10  0.069 309  0.069  17  0.019 303  0.026 262
CN                0.674   0.741   3  0.267  38  0.079 359  0.064 348  0.043 283  0.010 266  0.006  80  0.005 320  0.003 246
CM               -0.028   0.045 244  0.026 128  0.006 104  0.011 101  0.005  49  0.004  11  0.002  59  0.001 300  0.001 358

DCP 1    .016     0.931   3.540 348  0.985  45  0.202  56  0.148 350  0.042  63  0.046 190  0.025 208  0.032 295  0.029 300
DCP 2    .020     0.986   3.188 351  0.862  45  0.224  77  0.103 330  0.048 251  0.049 240  0.059 186  0.029 327  0.050 348
DCP 3    .030     1.091   2.809 351  0.789  45  0.254  88  0.091 292  0.100 251  0.047 275  0.018 138  0.025 320  0.032 359
DCP 4    .045     1.413   2.376 351  0.756  45  0.194  94  0.078 255  0.117 254  0.081 324  0.080  61  0.046  92  0.013 200
DCP 5    .076     2.043   1.113 354  0.188 333  0.379 340  0.144   0  0.119 282  0.133   2  0.176  85  0.078 113  0.039 142
DCP 6    .099     1.702   1.672 352  0.664  52  0.143   6  0.124 347  0.001  27  0.062 191  0.055 115  0.017 357  0.015 325
DCP 7    .149     1.531   1.474 352  0.734  54  0.186 345  0.154  15  0.037 282  0.041 211  0.090  88  0.011 246  0.028  35
DCP 8    .200     1.233   1.141 355  0.790  60  0.217 340  0.234  39  0.111 306  0.041 332  0.039  68  0.044 295  0.041  70
DCP 9    .250     1.053   1.002 357  0.599  56  0.165 350  0.249  28  0.125 292  0.097   3  0.037 258  0.070 335  0.017 220
DCP10    .300     0.907   0.891   5  0.385  50  0.109  11  0.132  15  0.125 320  0.044 346  0.057 306  0.050 316  0.033 275
DCP11    .399     0.712   0.762  10  0.225  39  0.114   7  0.068 327  0.077 314  0.032 208  0.028 319  0.008 258  0.026 251
DCP12    .501     0.558   0.631  15  0.178  15  0.068   6  0.068 306  0.041 284  0.028 220  0.015 286  0.015 207  0.012 253
DCP13    .600     0.662   0.492  22  0.166   2  0.040 354  0.071 299  0.032 248  0.023 237  0.017 209  0.012 162  0.006 177
DCP14    .701     0.459   0.315  32  0.139 349  0.010 246  0.049 296  0.033 214  0.016 193  0.013 162  0.008 125  0.009 146
DCP15    .800     0.242   0.263  29  0.123 326  0.028 250  0.060 286  0.032 209  0.012 164  0.007 149  0.006  86  0.008 132
DCP16    .900    -0.070   0.165  25  0.094 310  0.037 287  0.043 270  0.026 207  0.017 184  0.011 133  0.014  77  0.007  70
DCP17    .969    -0.074   0.022  92  0.039 295  0.012 297  0.019 291  0.011 214  0.004 176  0.002  87  0.007  58  0.001 107
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                         FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1

                TUNED HZ  DRIVE HZ  K         MACH NO   DEL.ALPHA  DEL.H     ALPHA.0    TEST POINT  CYCLES ANALYSED
                  0.0       22.97     0.167     0.232     10.10      0.0       0.01       12171.1     20

                V         Q         RN        CN(MIN)   CN(MAX)    ALPHA.NMAX AERO DAMP  TDR         EXT DAMP
                  69.9    12411.    0.33E 07  -0.077    0.964      13.40      -0.00141   0.909       0.0
                (229.3)   (259.2)
                                                   HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI  RES 2 PHI  RES 3 PHI  RES 4 PHI  RES 5 PHI  RES 6 PHI  RES 7 PHI  RES 8 PHI  RES 9 PHI

ALPHA             0.007  10.299   0  0.481 356  0.150 327  0.029  22  0.019 284  0.036 166  0.024 167  0.028 136  0.006  67
CN                0.169   0.830   0  0.061  19  0.006 346  0.004  24  0.002 279  0.002 290  0.007 335  0.015 146  0.003  48
CM               -0.025   0.039 246  0.007 287  0.002 329  0.001 327  0.001 358  0.000 292  0.002 172  0.007 339  0.001 188

DCP 1    .010    -0.910   5.029 349  0.828 356  0.216 287  0.199   8  0.072  42  0.051 266  0.059  27  0.082  70  0.059 136
DCP 2    .020    -0.290   4.210 350  0.912 357  0.046 332  0.010 244  0.013 303  0.027 262  0.006 288  0.026  12  0.016  70
DCP 3    .030     0.121   3.584 350  0.257 346  0.066 336  0.004 322  0.009 313  0.014 253  0.010 220  0.011  15  0.009 130
DCP 4    .045     0.136   2.875 351  0.229 351  0.041 338  0.012 251  0.004 296  0.006 132  0.013 279  0.016  42  0.016 358
DCP 5    .076     0.247   2.363 351  0.176 351  0.032 343  0.008 315  0.011 284  0.007 330  0.006 318  0.011   8  0.003  43
DCP 6    .099     0.666   1.677 353  0.167 359  0.174 352  0.074  13  0.013 246  0.004 169  0.008 280  0.019 336  0.008  77
DCP 7    .149     0.239   1.490 355  0.129   4  0.015  11  0.037 349  0.005 332  0.006 273  0.010 249  0.019  43  0.005  96
DCP 8    .200     0.262   1.222 356  0.092  18  0.013  15  0.008   1  0.035 164  0.037  39  0.013 319  0.014  43  0.015 152
DCP 9    .250     0.226   1.044 359  0.099  15  0.007 349  0.009  35  0.005 253  0.008 124  0.011 350  0.022 161  0.008  13
DCP10    .300     0.228   0.879   0  0.075  23  0.007 350  0.004 175  0.006 251  0.005 336  0.035 331  0.022 142  0.002 185
DCP11    .399     0.219   0.698   7  0.066  39  0.037  36  0.003 107  0.005 340  0.003 336  0.009 359  0.023 157  0.004  35
DCP12    .501     0.148   0.562  12  0.049  41  0.006  62  0.001  56  0.009 265  0.010 260  0.006 334  0.023 166  0.010 328
DCP13    .600     0.195   0.412  16  0.045  50  0.030  45  0.007   5  0.002 108  0.011 196  0.013 339  0.019 172  0.006  79
DCP14    .701     0.220   0.288  23  0.066  62  0.002 243  0.008  55  0.038 161  0.005 155  0.036 301  0.023 151  0.004 277
DCP15    .800     0.120   0.179  17  0.026  49  0.003 146  0.002 317  0.002 197  0.003  87  0.006   0  0.024 156  0.003   3
DCP16    .900    -0.044   0.065  66  0.013 128  0.007 236  0.011 164  0.009 250  0.036 179  0.005   2  0.027 130  0.002 305
DCP17    .969     0.019   0.029 153  0.007 244  0.016 162  0.024 173  0.007  66  0.018  18  0.011  14  0.033 175  0.017  57
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

              F,RIG HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DELTA        ALPHA.0      TEST POINT   CYCLES ANALYSED
              3.0          26.00        0.172        0.190        10.29        0.0          2.46         12171.2      20

              T            Q            RN           CM(MEAN)     CN(MEAN)     ALPHA.MAX    AERO DAMP    TDP          EXT DAMP
               68.2         11984       0.329 07     -0.076       1.198        12.62        -0.00146     0.018        0.0
              (223.7)      (250.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.460   10.288   0   0.050 355    0.154 326    0.011  12    0.012 249    0.003 192    0.016 163    0.022 190    0.006 109
CN                  1.387    0.811   ?   0.076  71    0.012 355    0.024 346    0.302  27    0.003 275    0.004 125    0.015 139    0.002  79
CM                 -0.010    0.061 242   0.007 245    0.002  37    0.011 212    0.036 229    0.001 130    0.002 244    0.007 346    0.002 246

DCP 1    .010       4.851    9.707 347   0.675  24    0.146  13    0.120 235    0.346 161    0.007  76    0.034 267    0.001  23    0.004 306
DCP 2    .023       6.841    4.242 351   0.551 357    0.047 346    0.018 351    0.316 271    0.037  69    0.019 336    0.062  47    0.018 306
DCP 3    .033       1.101    3.637 351   0.244 351    0.065 348    0.012 329    0.007 291    0.003 183    0.011 313    0.034  42    0.014 288
DCP 4    .049       2.522    2.951 351   0.224 347    0.356 337    0.324 339    0.011 256    0.001  16    0.006 255    0.035  55    0.012 229
DCP 5    .076       1.912    2.389 351   0.141 346    0.346 346    0.037 315    0.038 351    0.036 233    0.012 283    0.029  44    0.004 291
DCP 6    .099       1.809    1.985 353   0.161   2    0.039 357    0.017 327    0.034 339    0.037 104    0.006 337    0.032  26    0.013 296
DCP 7    .149       0.738    1.519 355   0.137   5    0.331  21    0.006 240    0.043 166    0.009 116    0.002   3    0.020  53    0.015 296
DCP 8    .200       0.679    1.262 357   0.136  16    0.326 351    0.332 162    0.036 113    0.014 286    0.015 286    0.036  42    0.016 203
DCP 9    .250       0.512    1.054 356   0.062  17    0.017  30    0.003   6    0.014 366    0.005 167    0.009 159    0.015 168    0.004  63
DCP10    .300       0.452    0.856   1   0.304  26    0.311  43    0.015  27    0.037 261    0.036 242    0.038 142    0.016 130    0.013  95
DCP11    .399       0.419    0.735   8   0.064  42    0.013 352    0.013  54    0.001  76    0.010 235    0.009 145    0.026 167    0.036  36
DCP12    .501       0.288    0.567  12   0.055  37    0.006   6    0.005 349    0.036  21    0.009 246    0.006 103    0.016 153    0.015  97
DCP13    .600       0.330    0.412  18   0.051  41    0.032 133    0.011 318    0.035 323    0.035 291    0.004 156    0.030 160    0.017 127
DCP14    .701       0.290    0.244  25   0.041  52    0.039 336    0.007  45    0.002 256    0.003 287    0.019  99    0.018 171    0.008 170
DCP15    .800       0.143    0.172  35   0.036  64    0.009 189    0.003 132    0.006  31    0.010 295    0.006  81    0.023 136    0.009  91
DCP16    .900      -0.024    0.091  47   0.016 126    0.021 202    0.026 359    0.014  65    0.007 322    0.012  96    0.002 181    0.007 326
DCP17    .969       0.019    0.022 135   0.006 159    0.005 206    0.002 348    0.003 235    0.002  12    0.013 191    0.017 160    0.010 192
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                         FORCED  PITCHING  OSCILLATION            AIRFOIL      NLR 1

              F,RIG HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DELTA        ALPHA.0      TEST POINT   CYCLES ANALYSED
              3.0          26.02        0.175        0.195        10.53        0.0          4.97         12171.3      20

              T            Q            RN           CM(MEAN)     CN(MEAN)     ALPHA.MAX    AERO DAMP    TDP          EXT DAMP
               66.9         11597.      0.327 07     -0.062       1.396        15.50        -0.00199     0.077        0.0
              (219.6)      (242.2)
                                                             HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.968   10.532   0   0.072 356    0.159 329    0.036  15    0.030 240    0.047 169    0.011 160    0.013 159    0.039  80
CN                  0.609    0.815   2   0.062  17    0.016  26    0.010 353    0.008 309    0.002 266    0.001 225    0.006  58    0.333 160
CM                 -0.013    0.066 243   0.006 270    0.032 260    0.003 151    0.001 350    0.001 230    0.002 133    0.006 243    0.003 146

DCP 1    .010       2.400    5.267 344   0.622  26    0.107   7    0.022 107    0.103 327    0.114 241    0.063 142    0.041 224    0.071 129
DCP 2    .023       2.063    4.361 351   0.366 359    0.356 358    0.014  37    0.034 295    0.011 319    0.013 149    0.017 256    0.013 131
DCP 3    .033       2.123    3.721 351   0.306 356    0.056 350    0.019  31    0.009  15    0.009 365    0.010 180    0.009 232    0.006 148
DCP 4    .049       1.755    3.001 352   0.283 355    0.040 313    0.023  55    0.015 330    0.020 206    0.011 103    0.009 266    0.011 153
DCP 5    .076       1.562    2.410 353   0.233 354    0.031 319    0.015  80    0.019 301    0.018 211    0.012 146    0.015 249    0.003 144
DCP 6    .099       1.504    2.015 354   0.195   1    0.019 340    0.015  54    0.012 270    0.014 197    0.006 140    0.021 243    0.009 155
DCP 7    .149       1.129    1.532 356   0.150   9    0.017  23    0.006 108    0.013 357    0.007 226    0.005 168    0.013 257    0.013 157
DCP 8    .200       0.878    1.250   0   0.112  11    0.006 313    0.011 137    0.003   6    0.007 246    0.008 170    0.011 234    0.015 203
DCP 9    .250       0.780    1.046   0   0.098  17    0.027  43    0.017 352    0.007 108    0.006 273    0.001 172    0.007  56    0.009  86
DCP10    .300       0.731    0.865   2   0.097  20    0.021  38    0.018 334    0.006 170    0.004 332    0.008 156    0.009  78    0.004 278
DCP11    .399       0.611    0.644  13   0.083  32    0.070  46    0.018   2    0.009 209    0.004 267    0.005  10    0.018  51    0.004  20
DCP12    .501       0.424    0.550  19   0.061  38    0.016  46    0.012 326    0.007 351    0.007  11    0.005 268    0.012  40    0.008 190
DCP13    .600       0.366    0.423  22   0.051  41    0.016  46    0.012 310    0.016   6    0.007 110    0.006 322    0.006  53    0.006 255
DCP14    .701       0.350    0.291  31   0.040  50    0.010 345    0.017 322    0.001 157    0.004  30    0.003 356    0.011  51    0.006  56
DCP15    .800       0.190    0.162  41   0.029  45    0.013  86    0.008 332    0.009 216    0.033 276    0.006   9    0.017  90    0.004 356
DCP16    .900      -0.022    0.094  55   0.007   4    0.008  71    0.014 353    0.005 153    0.007  44    0.014 257    0.016  65    0.009 141
DCP17    .969       0.008    0.026  62   0.036 272    0.005 201    0.013   3    0.005 180    0.009  83    0.012 351    0.026  40    0.010 316
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                 FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           0.0          23.01        0.177        0.193        10.32        0.0          7.47        12171.4       20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.CNMAX  AERO DAMP    TDR          EXT DAMP
           66.3         11391.       0.31E 07    -0.063        1.629        1 [illegible] -0.00134     0.727        0.0
          (217.5)      (237.9)
                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               7.467  10.323   0   0.993 355   0.144 323   0.046  27   0.382 224   0.034 131   0.013 140   0.009 236   0.006 164
CN                  0.751   0.546  12   0.133 326   0.150  43   0.023 328   0.336  93   0.336 349   0.012 232   0.021 351   0.003 233
CM                 -0.016   0.035 268   0.022   4   0.022 245   0.013  29   0.033 279   0.001 173   0.004  61   0.004 136   0.002  12

DCP 1     .010      3.093   4.393 356   1.115  15   0.368 260   0.276 154   0.174  53   0.115 345   0.106 296   0.040 261   0.020  37
DCP 2     .020      2.071   3.923   1   0.769   2   0.222 274   0.176 155   0.064  57   0.064 324   0.044 239   0.059  54   0.029  35
DCP 3     .030      2.756   3.575   0   0.573 341   0.123 213   0.117  49   0.374 316   0.057 164   0.020  64   0.048   7   0.013 288
DCP 4     .044      2.309   2.544   7   0.720 358   0.239 253   0.048 132   0.052  34   0.332 334   0.314 259   0.041  27   0.007  62
DCP 5     .074      1.857   2.148   0   0.605 351   0.209 230   0.173 133   0.365 446   0.026 268   0.015 233   0.041  37   0.017  16
DCP 6     .099      1.466   1.855   9   0.403 349   0.172 208   0.119  77   0.063 327   0.325 292   0.019 166   0.055  42   0.016 354
DCP 7     .149      1.379   1.550   8   0.336 323   0.155 159   0.115  35   0.062 279   0.039 188   0.019 191   0.062  28   0.031 302
DCP 8     .200      1.224   1.377   8   0.221 333   0.165 130   0.115  15   0.056 258   0.034 192   0.021 188   0.084  33   0.030 314
DCP 9     .253      1.021   1.196   8   0.147 264   0.163  44   0.112 335   0.356 215   0.031 114   0.317  54   0.335 302   0.016 191
DCP10     .300      0.938   0.987   9   0.048 244   0.132  93   0.088 321   0.340 165   0.021  61   0.036 334   0.023 265   0.016 151
DCP11     .349      0.772   0.796  16   0.347 281   0.113  78   0.066 332   0.029 146   0.023  29   0.016 235   0.014 333   0.003 179
DCP12     .551      0.541   0.633  23   0.334 250   0.343  72   0.051 280   0.324 119   0.016   3   0.317 226   0.023 322   0.007 257
DCP13     .600      0.464   0.441  27   0.022 230   0.089  65   0.044 275   0.322 111   0.009 345   0.021 209   0.022 305   0.312 133
DCP14     .731      0.341   0.356  35   0.321 165   0.077  63   0.034 279   0.026  77   0.011 292   0.319 249   0.317 297   0.005  18
DCP15     .8[illegible]   0.222   0.237  42   0.032 137   0.067  51   0.032 247   0.318  46   0.309 279   0.316 249   0.323 334   0.017 202
DCP16     .9[illegible]   0.019   0.136  55   0.038 145   0.064  25   0.020 199   0.013  76   0.008  35   0.008 282   0.021   2   0.315 201
DCP17     .964      0.016   0.038  44   0.034 231   0.323  37   0.011 265   0.319  27   0.005 242   0.021 235   0.317   0   0.005 294

                 FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
           [illegible]  23.03        0.177        0.191        10.[illegible] 0.0          9.95        12171.[illegible]  20

          V            Q            RN           CM(MIN)      CN(MAX)      ALPHA.CNMAX  AERO DAMP    TDR          EXT DAMP
           66.3         11328.       0.31E 07    -0.29[illegible] [illegible] 20.13     -0.00031      0.164        0.0
          (216.7)      (236.6)
                                                    HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0   RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               [illegible]                                     0.035  11   0.045 239   0.013 242   0.034 327   0.006  29
CN                  [illegible]                                     0.055 306   0.026 183   0.021  63   0.044 319   0.013 259
CM                  [illegible]                                     0.021  64   0.014 312   0.039 212   0.012 131   0.033  28

DCP 1     [illegible]                                               0.213 237   0.207 166   0.233  53   0.102  13   0.147 353
DCP 2     [illegible]                                               0.026 242   0.063 164   0.364  47   0.356 290   0.316 353
DCP 3     [illegible]                                               0.373  43   0.038  73   0.102 351   0.144 254   0.082 164
DCP 4     [illegible]                                               0.343  37   0.046 155   0.374  96   0.044 321   0.061 250
DCP 5     [illegible]                                               0.343  60   0.343 136   0.373  27   0.133 304   0.075 242
DCP 6     [illegible]                                               0.034  66   0.357  54   0.367 351   0.045 287   0.066 226
DCP 7     [illegible]                                               0.327  43   0.077   1   0.035 294   0.070 271   0.063 192
DCP 8     [illegible]                                               0.129  43   0.345 343   0.362 266   0.373 261   0.080 164
DCP 9     [illegible]                                               0.233   3   0.149 242   0.133 202   0.356 137   0.064  63
DCP10     [illegible]                                               0.177 342   0.136 256   0.048 163   0.056  74   0.075   7
DCP11     [illegible]                                               0.161 328   0.123 235   0.399 144   0.045  42   0.079 343
DCP12     [illegible]                                               0.134 336   0.094 201   0.374 113   0.037   6   0.064 295
DCP13     [illegible]                                               0.127 272   0.111 165   0.363  64   0.116 325   0.067 247
DCP14     [illegible]                                               0.114 236   0.101 119   0.340   3   0.073 244   0.363 196
DCP15     [illegible]                                               0.133 249   0.110  96   0.376 349   0.075 272   0.066 152
DCP16     [illegible]                                               0.324 236   0.033  63   0.332   3   0.363 288   0.327 153
DCP17     [illegible]                                               0.323 146   0.321  77   0.331   1   0.314 266   0.317  58
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO     DEL.ALPHA     DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
              0.0          22.94       0.113         0.292      10.35          0.0            0.02          12175.1        20

             V            Q            RN           CM(MIN)     CN(MAX)       ALPHA,NMAX     AERO DAMP      TOR          EXT DAMP
             103.2         27368.       3.46E 07    -0.072       1.025        10.50          -0.00107        0.892        0.0
            (338.7)       (571.6)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               0.017    10.353   0    0.965 352    0.144 322    0.027  43    0.012 277    0.025 166    0.019 196    0.018  88    0.007 291
CN                  0.154     0.817 359    0.067  31    0.016 125    0.023 161    0.015 223    0.011 254    0.036 261    0.004  53    0.004 243
CM                 -0.018     0.030 299    0.009 273    0.034 262    0.005 314    0.035 343    0.034  23    0.004  73    0.001 206    0.001  56

DCP 1     .010      0.041     5.110 354    0.612 224    0.635 276    0.556 341    0.295  36    0.142  77    0.063 133    0.037  20    0.105  70
DCP 2     .020      0.066     4.049 356    0.267 245    0.499 269    0.266 322    0.140  21    0.094  88    0.048 167    0.027 313    0.037  45
DCP 3     .030      0.204     3.697 354    0.100 320    0.164 242    0.123 291    0.089 335    0.025  66    0.018 199    0.022  24    0.029 104
DCP 4     .044      0.336     3.052 355    0.385 333    0.124 229    0.120 271    0.097 333    0.055  38    0.036 136    0.013 252    0.024 353
DCP 5     .074      0.327     2.604 353    0.183  19    0.032 161    0.042 224    0.083 295    0.054   6    0.044 107    0.031 180    0.037 277
DCP 6     .099      0.309     2.241 354    0.210  29    0.103 141    0.112 237    0.044 276    0.064 342    0.036  75    0.020 167    0.032 268
DCP 7     .149      0.247     1.760 354    0.223  29    0.114 119    0.110 162    0.082 250    0.051 310    0.022  40    0.011 129    0.023 242
DCP 8     .200      0.200     1.430 357    0.150  29    0.099 105    0.096 171    0.067 234    0.052 293    0.020   4    0.015  97    0.022 217
DCP 9     .250      0.179     1.234 355    0.192  26    0.046  86    0.092 150    0.066 238    0.046 262    0.023 326    0.017  72    0.015 210
DCP10     .300      0.161     1.027 356    0.147  23    0.083  74    0.070 135    0.056 195    0.041 256    0.023 296    0.013  41    0.014 139
DCP11     .399      0.150     0.738   3    0.081  30    0.035  69    0.035 126    0.031 159    0.029 223    0.028 264    0.012 357    0.008  59
DCP12     .501      0.150     0.505   7    0.048  43    0.039  67    0.013 136    0.017 154    0.017 210    0.019 242    0.005 313    0.005 285
DCP13     .600      0.176     0.442  12    0.037  63    0.004 133    0.013 169    0.013 161    0.011 201    0.010 237    0.006  96    0.004 190
DCP14     .701      0.221     0.316  15    0.043  72    0.007  74    0.012 152    0.011 174    0.011 210    0.012 245    0.003   4    0.002 271
DCP15     .800      0.106     0.164  26    0.032  93    0.013 133    0.035 159    0.008 166    0.039 164    0.007 229    0.005   2    0.031 300
DCP16     .900     -0.043     0.073  68    0.026 147    0.011 213    0.012 191    0.009 173    0.009 223    0.013 248    0.007  44    0.007 256
DCP17     .965     -0.026     0.035 145    0.004 128    0.013 130    0.015 271    0.015 166    0.010 161    0.005 258    0.007  59    0.008 211

                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

             TUNED HZ     DRIVE HZ     K            MACH NO     DEL.ALPHA     DEL.H          ALPHA.0        TEST POINT   CYCLES ANALYSED
              0.0          22.98       0.115         0.298      13.39          0.0            4.94          12175.3        20

             V            Q            RN           CM(MIN)     CN(MAX)       ALPHA,NMAX     AERO DAMP      TOR          EXT DAMP
             101.5         26650.       3.48E 07    -0.084       1.427        15.27          -0.00084        0.687        0.0
            (333.1)       (556.6)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               4.941    10.393   0    0.968 336    0.161 326    0.014  11    0.016 172    0.012 297    0.022 154    0.009  93    0.006  69
CN                  0.530     0.922   5    0.158 355    0.036 205    0.035  56    0.003 289    0.011 168    0.007  77    0.010 346    0.006 279
CM                 -0.016     0.024 266    0.015  53    0.027 306    0.017 190    0.011  73    0.006 312    0.003 217    0.004 157    0.002  65

DCP 1     .010      1.709     4.926 354    1.320  23    0.465 303    0.354 204    0.146 119    0.032 352    0.041 133    0.059  24    0.063 295
DCP 2     .020      1.521     3.752 355    1.014  22    0.511 304    0.328 204    0.229 110    0.151  13    0.073 290    0.025 205    0.014 274
DCP 3     .030      1.410     2.896 359    1.016  31    0.606 311    0.368 214    0.223 120    0.137  30    0.036   5    0.064 322    0.095 240
DCP 4     .044      1.562     2.787 356    0.569   7    0.148 287    0.074 176    0.041  64    0.026 339    0.018 256    0.014 165    0.012  92
DCP 5     .074      1.386     2.225 358    0.475   8    0.160 263    0.064 165    0.035  48    0.027 308    0.017 216    0.016 141    0.015  48
DCP 6     .099      1.298      .669   0    0.419   6    0.160 276    0.070 152    0.048  39    0.042 307    0.021 207    0.019 136    0.013  45
DCP 7     .149      0.973     1.440   2    0.338   3    0.122 259    0.066 136    0.055  21    0.036 286    0.023 163    0.010 129    0.010   3
DCP 8     .200      0.814     1.232   5    0.278 355    0.119 232    0.093 110    0.069   3    0.040 254    0.023 152    0.010 108    0.006  66
DCP 9     .250      0.731     1.113   4    0.224 342    0.100 195    0.094  73    0.066 313    0.037 206    0.017  72    0.015 299    0.004 127
DCP10     .300      0.690     0.967   4    0.190 325    0.126 175    0.124  59    0.085 311    0.047 210    0.024 126    0.014  28    0.012 344
DCP11     .399      0.578     0.816   9    0.139 323    0.134 162    0.105  53    0.073 296    0.035 190    0.021 131    0.016  25    0.014 315
DCP12     .501      0.414     0.624  11    0.103 324    0.094 154    0.092  36    0.063 284    0.040 165    0.023  63    0.020 341    0.008 303
DCP13     .600      0.342     0.453  17    0.073 342    0.057 141    0.071  18    0.054 249    0.036 133    0.025  23    0.019 319    0.011 269
DCP14     .701      0.326     0.291  23    0.049   3    0.045 128    0.054 358    0.048 233    0.036 111    0.016  16    0.017 312    0.012 242
DCP15     .800      0.174     0.232  26    0.019 307    0.051 119    0.051 349    0.036 222    0.020  97    0.003 307    0.013 355    0.013 246
DCP16     .900     -0.026     0.108  20    0.041 243    0.039 102    0.030 341    0.021 234    0.005  61    0.006  20    0.017 337    0.006 238
DCP17     .965     -0.029     0.010   1    0.030 241    0.016 103    0.013 325    0.004 176    0.008  78    0.007 [illegible]
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

               TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H       ALPHA.0     TEST POINT   CYCLES ANALYSED
                0.0          22.97       0.115       0.297      11.11        0.0          7.90       12175.4       20

               V            Q            RN          CM(MIN)     CM(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                101.1        26492.      3.48E 07   -0.215       1.047       17.67       -0.00079     0.647        0.0
               (331.8)      (553.3)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.496  10.330   0   0.443 357   0.158 326   0.050 313   0.089 162   0.080  50   0.044 168   0.033 157   0.013  72
CN                  0.677   0.713  15   0.272   7   0.113 201   0.071 104   0.096  77   0.045 352   0.031 264   0.018 223   0.019 149
CM                 -0.028   0.045 221   0.063  91   0.036   7   0.028 282   0.020 208   0.014 120   0.013  59   0.006   9   0.007 292

DCP 1    .010       4.108   4.862 356   2.065  53   0.975 349   0.404 289   0.203 259   0.189 227   0.189 176   0.144 149   0.146  74
DCP 2    .020       1.926   2.372   3   1.576  51   0.774 344   0.362 279   0.156 225   0.064 199   0.113 174   0.092 123   0.134  76
DCP 3    .030       1.848   1.950   3   1.363  53   0.709 348   0.350 284   0.143 231   0.087 222   0.130 179   0.112 123   0.134  72
DCP 4    .049       1.928   1.945   4   0.939  40   0.444 333   0.217 263   0.132 190   0.060 117   0.040  83   0.043  11   0.024 324
DCP 5    .074       1.715   1.651   6   0.743  33   0.357 317   0.167 235   0.100 157   0.054  75   0.026  42   0.033 335   0.021 270
DCP 6    .099       1.574   1.415   9   0.707  28   0.313 304   0.142 216   0.101 139   0.059  63   0.032   4   0.038 316   0.027 252
DCP 7    .149       1.233   1.230  13   0.560  14   0.287 281   0.162 189   0.046 121   0.075  52   0.042 354   0.044 308   0.035 242
DCP 8    .200       1.029   1.098  16   0.493  12   0.299 279   0.166 195   0.128 122   0.097  53   0.062 337   0.036 291   0.035 234
DCP 9    .250       0.920   0.987  15   0.427 359   0.238 260   0.162 176   0.130 133   0.108  82   0.070 308   0.050 264   0.038 209
DCP10    .300       0.840   0.868  16   0.361 354   0.233 251   0.145 169   0.110  97   0.103  20   0.058 298   0.033 252   0.032 235
DCP11    .399       0.719   0.768  20   0.302 349   0.189 243   0.147 163   0.120  82   0.104  15   0.067 295   0.043 251   0.048 203
DCP12    .501       0.548   0.630  22   0.228 339   0.154 224   0.114 141   0.100  65   0.060 356   0.061 273   0.037 235   0.050 170
DCP13    .600       0.462   0.510  24   0.166 326   0.145 235   0.179 118   0.095  44   0.064 321   0.063 243   0.033 203   0.049 166
DCP14    .701       0.427   0.378  27   0.141 310   0.132 164   0.098  94   0.089  21   0.078 300   0.061 228   0.035 176   0.043 103
DCP15    .800       0.255   0.290  23   0.179 294   0.116 171   0.034  85   0.074  11   0.062 287   0.038 213   0.034 165   0.042  76
DCP16    .900       0.015   0.162  17   0.067 275   0.065 166   0.045  88   0.052   4   0.038 268   0.021 211   0.018 133   0.028  59
DCP17    .965      -0.019   0.047  16   0.044 271   0.022 197   0.011 136   0.021  12   0.019 259   0.012 148   0.008 206   0.011  63
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL      NLR 1

               TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA    DEL.H       ALPHA.0     TEST POINT   CYCLES ANALYSED
                0.0          22.94       0.116       0.297      10.30        0.0          9.98       12175.5       20

               V            Q            RN          CM(MIN)     CM(MAX)      ALPHA.NMAX  AERO DAMP   TDR          EXT DAMP
                100.9        26392.      3.48E 07   -0.280       2.076       19.44       -0.00091     0.741        0.0
               (330.9)      (551.2)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               9.978  10.305   0   0.465 359   0.169 341   0.061   7   0.111 200   0.141 154   0.043 319   0.025 277   0.013  78
CN                  0.682   0.674  25   0.307   8   0.085 287   0.094 246   0.052 170   0.050 115   0.041  32   0.022 325   0.019 302
CM                 -0.043   0.078 238   0.060  48   0.031  22   0.021 352   0.023 208   0.017 227   0.016 169   0.010  96   0.006  72

DCP 1    .010       4.655   4.283  13   2.222  59   1.011   9   0.374  29   0.340 329   0.127 291   0.203 294   0.195 253   0.171 209
DCP 2    .020       2.337   1.358  14   1.771  57   0.563   1   0.215   4   0.239 317   0.068 255   0.119 303   0.143 260   0.129 216
DCP 3    .030       2.104   1.060  14   1.508  60   0.485  13   0.273  13   0.242 321   0.149 256   0.084 264   0.089 240   0.088 199
DCP 4    .049       2.319   1.425  13   1.316  51   0.393   9   0.228 336   0.183 284   0.116 225   0.083 231   0.068 150   0.053  97
DCP 5    .074       2.046   1.242  14   0.860  41   0.283 349   0.144 318   0.131 284   0.084 199   0.053 176   0.048 121   0.036  64
DCP 6    .099       1.869   1.143  13   0.782  33   0.253 328   0.112 295   0.114 246   0.086 175   0.044 149   0.039 104   0.038  55
DCP 7    .149       1.476   1.046  26   0.656  20   0.212 311   0.131 285   0.153 223   0.116 151   0.049 103   0.033  70   0.025  16
DCP 8    .200       1.237   0.946  29   0.557  20   0.217 316   0.164 274   0.155 215   0.128 158   0.077 107   0.047  41   0.027   3
DCP 9    .250       1.101   0.903  29   0.502  10   0.196 303   0.162 266   0.165 208   0.140 149   0.100  89   0.072  47   0.051   0
DCP10    .300       1.000   0.821  29   0.429   3   0.169 292   0.144 257   0.146 198   0.130 142   0.111  83   0.087  33   0.062 346
DCP11    .399       0.876   0.780  31   0.359 355   0.139 278   0.124 250   0.131 193   0.129 139   0.121  80   0.085  23   0.067 348
DCP12    .501       0.700   0.708  29   0.306 337   0.132 247   0.098 221   0.115 162   0.111 110   0.112  41   0.078 340   0.071 315
DCP13    .600       0.597   0.622  28   0.272 321   0.142 225   0.094 192   0.123 132   0.107  73   0.112   9   0.077 298   0.055 277
DCP14    .701       0.544   0.444  28   0.235 303   0.133 201   0.094 165   0.118 100   0.107  37   0.107 338   0.083 263   0.053 228
DCP15    .800       0.346   0.385  21   0.183 284   0.113 191   0.091 151   0.107  60   0.087  10   0.085 308   0.066 231   0.033 194
DCP16    .900       0.066   0.227  14   0.113 268   0.048 183   0.044 139   0.044  61   0.032   3   0.035 299   0.026 233   0.021 192
DCP17    .969      -0.002   0.096  17   0.074 276   0.033 197   0.027 134   0.027  47   0.027 348   0.030 274   0.021 202   0.019 138
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                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.O      TEST POINT  CYCLES ANALYSED
                   0.0         22.97       0.086        0.401      10.36        0.0          0.02       12177.1       20

                  V           Q           RN           CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR         EXT DAMP
                   135.8       47875.      0.64E 07    -0.379       1.077       10.61      -0.00090      0.984       0.0
                  (445.5)     (999.9)
                                                               HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               0.025   10.363   0   0.986 352   0.150 321   0.063  26   0.004  97   0.034 125   0.023 196   0.013 102   0.008  17
CN                  0.162    0.918 359   0.069  44   0.031 273   0.027 232   0.011 277   0.007 293   0.008 270   0.001 296   0.006  12
CM                 -0.012    0.026 306   0.012 260   0.007 309   0.009   2   0.006  55   0.004 108   0.002 117   0.000  39   0.032 126

DCP 1     .010      0.447    5.118 353   1.303 258   0.897 309   0.558  38   0.087 107   0.250  32   0.271  85   0.215 179   0.078 206
DCP 2     .020      0.319    3.985 356   0.661 259   0.536 299   0.265  32   0.112  63   0.101 299   0.064 126   0.171 133   0.031 276
DCP 3     .030      0.172    3.892 355   0.093 315   0.219 283   0.113 338   0.071 112   0.065 198   0.017 347   0.044 152   0.029 266
DCP 4     .049      0.444    3.111 356   0.126 269   0.263 283   0.147 334   0.099  91   0.074 171   0.043 303   0.036  76   0.044 179
DCP 5     .074      0.425    2.674 356   0.058  28   0.148 247   0.118 299   0.064  65   0.052 147   0.047 265   0.032  34   0.037 133
DCP 6     .099      0.449    2.793 356   0.105  52   0.117 233   0.102 289   0.055  36   0.050 151   0.056 257   0.042 356   0.037  87
DCP 7     .149      0.273    1.823 356   0.164  57   0.110 195   0.100 259   0.046 353   0.027 129   0.037 245   0.030 336   0.036  66
DCP 8     .200      0.209    1.499 359   0.158  59   0.130 182   0.094 268   0.052 336   0.019  90   0.039 242   0.028 326   0.042  59
DCP 9     .250      0.173    1.294 357   0.161  49   0.087 157   0.081 216   0.043 292   0.013 336   0.014 235   0.021 303   0.026   1
DCP10     .300      0.166    1.130 357   0.158  48   0.093 166   0.086 203   0.050 269   0.025 330   0.007 247   0.016 279   0.025 351
DCP11     .399      0.168    0.917   3   0.107  49   0.067 143   0.062 196   0.045 257   0.029 316   0.006 321   0.004 277   0.015 346
DCP12     .501      0.137    0.619   5   0.065  47   0.071 137   0.042 186   0.036 261   0.027 295   0.011 336   0.003 105   0.006 277
DCP13     .600      0.153    0.452   9   0.039  62   0.011 188   0.026 182   0.018 225   0.015 271   0.012 281   0.004 261   0.008 329
DCP14     .701      0.213    0.308  13   0.046  75   0.011 219   0.023 208   0.012 226   0.009 295   0.006 287   0.039 158   0.007 278
DCP15     .800      0.101    0.172  26   0.033  90   0.013 233   0.023 196   0.012 223   0.013 287   0.005 293   0.004 157   0.006 298
DCP16     .900     -0.063    0.055  76   0.019 165   0.012 216   0.017 186   0.012 213   0.015 280   0.004 281   0.002 179   0.003 229
DCP17     .969     -0.061    0.032 155   0.008 123   0.011 197   0.012 168   0.005 229   0.009 231   0.004 270   0.004  48   0.005 332


                              FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K            MACH NO     DEL.ALPHA   DEL.H       ALPHA.O      TEST POINT  CYCLES ANALYSED
                   0.0         22.94       0.087        0.398      10.35        0.0          2.50       12177.2       20

                  V           Q           RN           CN(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP    TDR         EXT DAMP
                   134.8       47363.      0.64E 07    -0.051       1.245       12.96      -0.00092      0.990       0.0
                  (442.4)     (989.2)
                                                               HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.509   10.351   0   0.988 351   0.169 315   0.012 351   0.039 148   0.010  17   0.046 167   0.032 131   0.019  20
CN                  0.323    0.850   0   0.143  16   0.065 277   0.019 171   0.017  24   0.007 277   0.007 175   0.001 322   0.004  16
CM                 -0.011    0.031 306   0.003  66   0.010  20   0.007 249   0.008 148   0.004  47   0.001 304   0.000 156   0.001 221

DCP 1     .010      0.991    5.329 350   0.780  43   0.882 337   0.995 312   0.528 148   0.468 132   0.081 263   0.075 284   0.101  23
DCP 2     .020      0.615    4.176 356   0.716  33   0.479 329   0.305 264   0.197 172   0.178 107   0.075  52   0.104 336   0.076 336
DCP 3     .030      0.775    3.828 356   0.669  76   0.244 316   0.256 234   0.135 163   0.131  92   0.083 352   0.117 311   0.036 271
DCP 4     .049      0.926    3.196 355   0.491  19   0.186 307   0.152 223   0.029 149   0.081  21   0.019  31   0.028 197   0.029 222
DCP 5     .074      0.902    2.539 355   0.403  16   0.144 292   0.113 195   0.036  69   0.076 341   0.019 256   0.036 147   0.013 128
DCP 6     .099      0.847    2.084 356   0.362  20   0.143 299   0.096 201   0.040  86   0.062 346   0.022 238   0.030 143   0.012  77
DCP 7     .149      0.642    1.606 357   0.283  13   0.126 279   0.085 178   0.051  60   0.047 334   0.015 208   0.011 107   0.014 247
DCP 8     .200      0.522    1.323   0   0.225  12   0.102 273   0.061 163   0.049  46   0.036 317   0.015 199   0.008  42   0.008 241
DCP 9     .250      0.453    1.144 359   0.193   0   0.093 248   0.066 129   0.054  13   0.047 289   0.027 178   0.012 126   0.012  57
DCP10     .300      0.420    0.951   0   0.156 359   0.078 269   0.067 113   0.047  17   0.027 271   0.027 187   0.006 181   0.010  56
DCP11     .399      0.346    0.760   5   0.126  10   0.063 250   0.036 114   0.039   1   0.026 260   0.020 169   0.005  94   0.003  83
DCP12     .501      0.252    0.569   8   0.103  16   0.056 256   0.031 114   0.036 358   0.023 246   0.017 157   0.008 359   0.006   5
DCP13     .600      0.220    0.415  13   0.086  23   0.049 256   0.018 116   0.026 352   0.018 238   0.010 138   0.002 333   0.008  20
DCP14     .701      0.244    0.260  20   0.079  37   0.044 266   0.012  97   0.026 328   0.015 206   0.006  90   0.006 352   0.005  16
DCP15     .800      0.172    0.160  27   0.032  30   0.030 236   0.012  40   0.022 316   0.013 178   0.006  57   0.003 285   0.005  28
DCP16     .900     -0.352    0.070  41   0.026 247   0.028 235   0.023  20   0.020 295   0.006 187   0.007   7   0.007 285   0.002 178
DCP17     .969     -0.038    0.018 142   0.026 251   0.023 192   0.008  56   0.008 317   0.006 147   0.005 221   0.003 199   0.002  16
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                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

         TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT   CYCLES ANALYSED
          0.0          22.92        0.087      0.397       10.31        0.0          4.95       12177.3       20

         V            Q            RN         CM(MIN)     CN(MAX)     ALPHA,NMAX   AERO DAMP   TDR          EXT DAMP
          134.3        47071.       0.66E 07  -0.171       1.464        15.12       -0.00091     0.981        0.0
         (440.6)      (983.1)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             4.968  10.309   0   0.962 353   0.189 339   0.028 300   0.040 224   0.067 130   0.045 283   0.033 168   0.023  61
CN                0.482   0.749   6   0.233  23   0.090 295   0.035 198   0.021 136   0.021  55   0.022 319   0.014 245   0.009 163
CM               -0.018   0.029 299   0.024 116   0.076  21   0.016 291   0.009 229   0.008 173   0.007 113   0.007  22   0.004 314

DCP 1    .010     1.493   4.737 348   1.341  62   0.777  29   0.451 306   0.264 295   0.126 240   0.186 218   0.087 176   0.110 116
DCP 2    .020     1.361   3.505 353   0.986  53   0.526   4   0.275 315   0.172 262   0.130 211   0.107 214   0.079 155   0.110  98
DCP 3    .030     1.308   2.804 353   0.959  59   0.618   4   0.389 304   0.272 239   0.170 173   0.089 134   0.064  64   0.059  59
DCP 4    .049     1.389   2.615 356   0.799  46   0.461 342   0.232 273   0.136 206   0.079 132   0.015  67   0.031  10   0.016  11
DCP 5    .074     1.248   1.959 357   0.693  42   0.385 332   0.195 255   0.111 182   0.069 112   0.023  45   0.042   5   0.032 319
DCP 6    .099     1.164   1.676 359   0.611  40   0.319 326   0.158 263   0.085 166   0.047  97   0.015  10   0.031   3   0.023 308
DCP 7    .149     0.988   1.324   1   0.471  38   0.244 308   0.125 220   0.058 148   0.038 136   0.020  40   0.034 351   0.024 290
DCP 8    .200     0.763   1.112   5   0.385  28   0.192 336   0.099 215   0.058 156   0.051 100   0.038  25   0.037 336   0.024 259
DCP 9    .250     0.660   1.001   5   0.335  15   0.163 283   0.081 196   0.053 133   0.069  41   0.065   4   0.038 309   0.021 243
DCP10    .300     0.632   0.964   6   0.292  10   0.165 273   0.085 182   0.060 127   0.052  63   0.056 348   0.030 283   0.022 221
DCP11    .399     0.512   0.763  11   0.235   6   0.176 261   0.076 165   0.046 104   0.042  57   0.047 344   0.033 271   0.021 209
DCP12    .501     0.383   0.566  14   0.181   3   0.098 249   0.058 143   0.035  85   0.038  37   0.047 322   0.038 237   0.026 163
DCP13    .600     0.371   0.436  17   0.166   0   0.080 235   0.055 126   0.031  58   0.031  13   0.061 309   0.035 216   0.026 147
DCP14    .701     0.320   0.388  23   0.108   2   0.066 221   0.052 107   0.025  36   0.028 346   0.034 284   0.032 194   0.019 116
DCP15    .800     0.178   0.211  26   0.078 332   0.065 207   0.051 100   0.027  33   0.028 335   0.024 261   0.026 173   0.012 108
DCP16    .900    -0.029   0.121  21   0.060 281   0.047 194   0.028  97   0.017  43   0.025 333   0.023 261   0.023 177   0.013  92
DCP17    .965    -0.035   0.021  42   0.046 270   0.025 212   0.012 130   0.007  86   0.015 353   0.013 260   0.013 192   0.011 100
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                    FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

         TUNED HZ     DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H        ALPHA.0     TEST POINT   CYCLES ANALYSED
          0.0          22.96        0.087      0.396       10.32        0.0          7.51       12177.4       20

         V            Q            RN         CM(MIN)     CN(MAX)     ALPHA,NMAX   AERO DAMP   TDR          EXT DAMP
          133.9        46927.       0.66E 07  -0.181       1.636        16.08       -0.00106     1.135        0.0
         (439.4)      (980.1)
                                                     HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             7.512  10.325   0   0.941 358   0.163 347   0.075  16   0.080 315   0.129 217   0.078 114   0.042  45   0.009 358
CN                0.638   0.623  12   0.282  31   0.084 325   0.066 296   0.036 212   0.022 170   0.030 114   0.024  47   0.016 337
CM               -0.027   0.048 220   0.036 118   0.022  38   0.011  22   0.016 330   0.011 267   0.009 245   0.011 178   0.007 112

DCP 1    .010     2.336   5.117 344   1.613  77   0.824  36   0.297   6   0.310 349   0.204 298   0.132 311   0.111 241   0.065 224
DCP 2    .020     1.863   2.362 353   1.290  70   0.518  32   0.296  11   0.221 340   0.161 296   0.093 276   0.077 223   0.062 227
DCP 3    .030     1.750   1.824 352   1.244  72   0.643  22   0.243 342   0.166 324   0.157 287   0.110 253   0.139 196   0.061 173
DCP 4    .049     1.762   1.619   0   1.040  59   0.459   1   0.169 320   0.125 307   0.116 253   0.053 195   0.063 168   0.030 126
DCP 5    .074     1.585   1.336   3   0.911  52   0.356 349   0.118 319   0.103 297   0.099 237   0.050 166   0.048 150   0.034 105
DCP 6    .099     1.449   1.158   0   0.777  48   0.282 342   0.093 313   0.092 289   0.095 227   0.055 154   0.044 137   0.033  91
DCP 7    .149     1.153   1.010  13   0.580  37   0.230 329   0.085 332   0.085 259   0.071 205   0.049 146   0.042 118   0.026  54
DCP 8    .200     0.966   0.925  13   0.461  36   0.165 331   0.069 302   0.083 252   0.064 203   0.053 151   0.039 111   0.031  50
DCP 9    .250     0.884   0.828  13   0.416  27   0.142 321   0.091 289   0.090 232   0.068 185   0.064 134   0.054  97   0.044  45
DCP10    .300     0.777   0.728  15   0.353  23   0.125 316   0.094 276   0.087 215   0.057 170   0.059 127   0.060  83   0.048  21
DCP11    .399     0.666   0.658  20   0.280  17   0.084 302   0.069 280   0.076 214   0.048 166   0.063 130   0.063  76   0.045  14
DCP12    .501     0.522   0.556  22   0.223   6   0.069 278   0.050 264   0.069 192   0.042 141   0.054 112   0.055  45   0.045 343
DCP13    .600     0.434   0.456  25   0.167 357   0.069 254   0.042 236   0.065 168   0.040 307   0.045  90   0.056  18   0.042 308
DCP14    .701     0.410   0.341  29   0.151 345   0.073 227   0.030 236   0.060 152   0.043  82   0.040  60   0.057 348   0.042 277
DCP15    .800     0.256   0.277  26   0.125 321   0.068 273   0.038 196   0.061 137   0.046  69   0.032  39   0.048 336   0.032 267
DCP16    .900     0.016   0.178  20   0.091 330   0.065 229   0.035 193   0.042 121   0.028  59   0.030  27   0.036 322   0.024 247
DCP17    .965    -0.027   0.051  26   0.068 291   0.019 243   0.025 215   0.020 135   0.009  76   0.009  45   0.016 341   0.008 249
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                  FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
              0.0        22.97      0.088       0.396     10.25        0.0         9.99     12177.5      20

            V           Q           RN         CN(MIN)    CN(MAX)     ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
             133.7       46860.      0.66E 07  -0.223      1.739       17.13     -0.00131    1.606       0.0
            (438.5)     (978.7)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.000  10.256   0   0.063 358   0.122 347   0.091  96   0.018  42   0.141 320   0.221 175   0.058 123   0.033  89
CN                 0.763   0.509  26   0.304  35   0.076 358   0.045 313   0.021 300   0.037 266   0.044 102   0.008 162   0.016 115
CM                -0.337   0.069 219   0.044 125   0.020  98   0.022  57   0.011  17   0.016   4   0.012 312   0.010 251   0.039 240

DCP 1    .010      2.870   1.646 360   1.823  82   0.673  59   0.409  60   0.274  40   0.228  28   0.162  35   0.083 325   0.074   4
DCP 2    .020      2.607   1.380 355   1.633  76   0.496  58   0.275  69   0.186  48   0.731  19   0.089  27   0.112 324   0.350 328
DCP 3    .030      2.168   0.950 353   1.381  78   0.478  51   0.266  60   0.287  43   0.257 356   0.065 336   0.118 324   0.119 306
DCP 4    .049      2.051   0.866  16   1.186  63   0.390  19   0.241  39   0.157   6   0.154 339   0.065 272   0.074 265   0.050 257
DCP 5    .074      1.860   0.716  23   0.976  53   0.271  33   0.190  42   0.139 323   0.164 336   0.044 217   0.112 236   0.075 273
DCP 6    .099      1.442   0.708  27   0.897  52   0.161  29   0.183  26   0.104 237   0.138 326   0.084 251   0.064 262   0.057 222
DCP 7    .149      1.341   0.751  28   0.622  41   0.136  16   0.168   0   0.087 316   0.105 306   0.097 228   0.055 223   0.056 192
DCP 8    .200      1.136   0.709  29   0.502  42   0.167  16   0.127 342   0.067 313   0.098 298   0.094 226   0.065 229   0.055 193
DCP 9    .250      1.022   0.693  27   0.430  32   0.136 357   0.101 316   0.055 298   0.094 276   0.098 205   0.050 196   0.058 151
DCP10    .300      0.919   0.673  28   0.359  29   0.117 357   0.096 308   0.046 292   0.087 269   0.092 199   0.062 189   0.052 148
DCP11    .399      0.794   0.603  31   0.297  26   0.098 349   0.089 297   0.039 280   0.073 263   0.084 206   0.036 188   0.050 146
DCP12    .501      0.636   0.566  32   0.263  11   0.080 326   0.078 277   0.033 256   0.067 239   0.077 187   0.036 144   0.051 117
DCP13    .600      0.533   0.480  33   0.208 357   0.069 332   0.078 256   0.036 215   0.063 209   0.073 156   0.038  95   0.046  83
DCP14    .701      0.402   0.391  37   0.195 342   0.062 276   0.078 279   0.040 189   0.063 184   0.068 125   0.048  64   0.050  45
DCP15    .800      0.320   0.334  31   0.155 325   0.069 267   0.080 228   0.043 181   0.064 166   0.062 103   0.049  44   0.044  23
DCP16    .900      0.253   0.222  22   0.106 312   0.051 271   0.051 217   0.023 182   0.040 160   0.028  90   0.029  44   0.025  18
DCP17    .969     -0.015   0.079  24   0.048 313   0.036 296   0.028 231   0.013 198   0.019 164   0.017 114   0.021  45   0.012  38
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                  FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ    K          MACH NO    DEL.ALPHA   DEL.H      ALPHA.O    TEST POINT  CYCLES ANALYSED
              0.0        45.64      0.171       0.400     11.06        0.0         0.00     12178.1      20

            V           Q           RN         CN(MIN)    CN(MAX)     ALPHA,NMAX AERO DAMP  TOR         EXT DAMP
             135.9       48043.      0.66E 07  -0.096      1.005       11.33     -0.00082    0.916       0.0
            (446.0)     (1003.4)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.004  11.064   0   1.193 355   0.176 330   0.054 208   0.071 178   0.051 107   0.040 128   0.040 199   0.010 172
CN                 0.160   0.905   1   0.113  41   0.032  67   0.020 152   0.013 189   0.005 207   0.003 203   0.003 196   0.004 163
CM                -0.012   0.045 291   0.015 251   0.012 253   0.011 288   0.005 310   0.003  15   0.001  56   0.001 227   0.002 316

DCP 1    .010      0.560   5.009 350   1.019 239   0.876 278   0.433 352   0.031 186   0.262 316   0.278   3   0.106  86   0.049  65
DCP 2    .020      0.277   3.856 355   0.303 236   0.514 289   0.265 321   0.027  50   0.070 293   0.103 350   0.108  68   0.049 104
DCP 3    .030      0.206   3.811 352   0.176   4   0.178 295   0.121 318   0.060 107   0.051 166   0.015 292   0.018 180   0.323 230
DCP 4    .049      0.437   3.123 356   0.090  33   0.176 256   0.191 288   0.072  15   0.060 115   0.045 240   0.044 336   0.041  81
DCP 5    .074      0.390   2.696 353   0.240  41   0.074 192   0.144 254   0.057 326   0.043  82   0.043 208   0.050 296   0.046  35
DCP 6    .099      0.422   2.300 356   0.269  42   0.063 152   0.107 261   0.056 308   0.040  76   0.043 180   0.045 268   0.029 358
DCP 7    .149      0.258   1.819 356   0.299  40   0.116 116   0.102 205   0.054 268   0.025  42   0.033 164   0.048 236   0.031 309
DCP 8    .200      0.217   1.461   0   0.251  46   0.105 106   0.079 196   0.054 258   0.016  11   0.027 150   0.046 234   0.037 296
DCP 9    .250      0.166   1.292 356   0.257  32   0.123  80   0.079 158   0.056 215   0.039 309   0.031 172   0.044 169   0.035 222
DCP10    .300      0.159   1.377 357   0.235  28   0.127  66   0.086 133   0.058 190   0.021 245   0.015  57   0.030 140   0.035 186
DCP11    .399      0.158   0.833   7   0.168  37   0.096  61   0.070 123   0.043 181   0.025 236   0.007 315   0.016 123   0.029 183
DCP12    .501      0.137   0.617  13   0.139  43   0.057  53   0.066  96   0.026 142   0.019 196   0.005 277   0.007  90   0.016 137
DCP13    .600      0.155   0.469  21   0.087  55   0.047  55   0.036 103   0.015 156   0.012 216   0.008 297   0.013  35   0.007 109
DCP14    .701      0.216   0.326  27   0.076  60   0.033  49   0.027  89   0.022 110   0.011 198   0.011 251   0.009 350   0.011  76
DCP15    .800      0.106   0.207  41   0.055  78   0.026  70   0.027  97   0.016  87   0.039 158   0.007 212   0.002 331   0.003 120
DCP16    .900     -0.060   0.107  80   0.036 116   0.018 140   0.019 119   0.010 107   0.007 146   0.007 122   0.005 356   0.006  97
DCP17    .969     -0.039   0.056 137   0.022 131   0.016 110   0.022 168   0.007 107   0.039 196   0.006 308   0.006  32   0.006  46
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                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                  TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0          45.47       0.172         0.398       11.07         0.0           2.48       12179.2       20

                  V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                   134.8        47478.       0.64E 07    -0.076         1.223        13.60       -0.00093      1.023        0.0
                  (442.3)      (991.6)                                  HARMONIC ANALYSIS
DATA
TYPE        X/C        RES 0     RES 1 PHI     RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                  2.483    11.066   0     1.198 357    0.406 325    0.034 310    0.061 186    0.031 112    0.039 137    0.040 197    0.005 158
CN                     0.337     0.850   4     0.123   9    0.013 250    0.007 330    0.014 278    0.006 111    0.004  20    0.005 273    0.003 224
CM                    -0.009     0.055 296     0.004 304    0.010 319    0.007 177    0.006  71    0.002 309    0.002 171    0.001 109    0.001 101

DCP 1      .010        0.656     5.490 346     0.820  75    0.774 318    0.455 271    0.454 102    0.293  88    0.170 176    0.023  85    0.137 306
DCP 2      .020        0.725     4.300 353     0.658  16    0.379 316    0.272 233    0.131 143    0.151  63    0.075  26    0.063 285    0.050 267
DCP 3      .030        0.857     3.878 352     0.602  11    0.171 304    0.244 206    0.090 126    0.124  32    0.072 306    0.102 256    0.029 183
DCP 4      .049        0.981     3.123 353     0.423   2    0.131 307    0.113 199    0.009 114    0.066 340    0.025 333    0.023 166    0.049 164
DCP 5      .074        0.961     2.560 353     0.336 354    0.079 287    0.051 149    0.039 344    0.047 283    0.019 170    0.012 101    0.018 117
DCP 6      .099        0.894     2.122 355     0.313   2    0.069 290    0.056 152    0.028 350    0.049 287    0.017 188    0.016  91    0.017  90
DCP 7      .149        0.686     1.629 357     0.231 353    0.053 249    0.045 113    0.049 343    0.026 259    0.013 135    0.012 229    0.020 152
DCP 8      .200        0.557     1.336   3     0.179   0    0.032 236    0.034  94    0.044 336    0.021 229    0.013 128    0.006  80    0.005 156
DCP 9      .250        0.482     1.155   1     0.149 351    0.036 170    0.040  46    0.048 289    0.016 169    0.009 113    0.001 121    0.007  11
DCP10      .300        0.431     0.955   3     0.125 356    0.025 149    0.036  15    0.044 279    0.021 163    0.014  60    0.010 263    0.002 271
DCP11      .399        0.356     0.764  16     0.102  16    0.027 137    0.030  24    0.035 293    0.018 196    0.011  68    0.014 335    0.009 251
DCP12      .501        0.260     0.588  19     0.087  18    0.023 151    0.024   4    0.028 267    0.017 144    0.014  19    0.006 305    0.007 249
DCP13      .600        0.223     0.444  28     0.076  29    0.018 140    0.022   0    0.026 262    0.014 104    0.015 348    0.006 286    0.005 261
DCP14      .701        0.265     0.309  41     0.074  31    0.022 170    0.021   4    0.023 247    0.019 102    0.011 334    0.005 239    0.001  42
DCP15      .800        0.116     0.210  52     0.038  39    0.022 149    0.027 332    0.019 224    0.012  64    0.009 296    0.003 200    0.007 301
DCP16      .900       -0.063     0.101  67     0.016 109    0.029 137    0.025 300    0.013 197    0.003  75    0.002  51    0.012 297    0.007 121
DCP17      .969       -0.050     0.065 131     0.016 238    0.017 148    0.012 303    0.008 218    0.002 351    0.006 351    0.004 200    0.009 263

                              FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

                  TUNED HZ     DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
                    0.0          45.56       0.173         0.396       11.00         0.0           4.91       12179.3       20

                  V            Q            RN           CN(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
                   134.0        47105.       0.64E 07    -0.126         1.518        16.08       -0.00069      0.761        0.0
                  (439.7)      (983.8)                                  HARMONIC ANALYSIS
DATA
TYPE        X/C        RES 0     RES 1 PHI     RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                  4.914    11.000   0     1.242   0    0.460 319    0.087  78    0.042 159    0.023 172    0.035 109    0.043 173    0.012 163
CN                     0.489     0.865  12     0.192 350    0.039 216    0.014 109    0.024   4    0.012 259    0.005 195    0.009 152    0.010  45
CM                    -0.020     0.067 252     0.031  64    0.031 317    0.017 216    0.012 145    0.007  45    0.002 105    0.002 276    0.004 187

DCP 1      .010        1.292     4.494 349     1.444  43    0.728 358    0.482 260    0.202 218    0.086 230    0.131 177    0.141 112    0.064  52
DCP 2      .020        1.179     3.442 357     1.037  38    0.576 342    0.288 276    0.148 262    0.142 196    0.119 141    0.091  92    0.059  42
DCP 3      .030        1.149     2.732 359     1.061  37    0.646 329    0.342 252    0.121 198    0.089 179    0.120 131    0.121  71    0.092   2
DCP 4      .049        1.358     2.578   0     0.762  20    0.433 311    0.195 225    0.057 137    0.010 158    0.044 116    0.040  58    0.040 337
DCP 5      .074        1.268     2.117   2     0.664  12    0.286 297    0.167 208    0.052  87    0.039 114    0.075  21    0.042 351    0.034 227
DCP 6      .099        1.166     1.912   4     0.562  11    0.243 298    0.110 191    0.037  85    0.014 106    0.033  51    0.026 310    0.016 253
DCP 7      .149        0.931     1.505   7     0.443 355    0.182 260    0.093 156    0.060  82    0.036  70    0.046 356    0.038 253    0.011 196
DCP 8      .200        0.782     1.295  13     0.370 356    0.153 250    0.092 148    0.051  83    0.067  41    0.037 323    0.030 236    0.033 227
DCP 9      .250        0.687     1.164  11     0.330 339    0.143 221    0.074 140    0.059  67    0.062   9    0.068 287    0.038 214    0.018 159
DCP10      .300        0.625     1.010  12     0.268 331    0.119 202    0.055 119    0.058  53    0.058 338    0.043 255    0.029 200    0.023 136
DCP11      .399        0.538     0.875  20     0.201 327    0.115 196    0.061 106    0.061  43    0.050 339    0.039 263    0.040 213    0.038 131
DCP12      .501        0.413     0.699  22     0.149 315    0.111 163    0.061  70    0.060  10    0.067 280    0.028 212    0.029 162    0.040  86
DCP13      .600        0.332     0.541  29     0.107 310    0.106 148    0.067  48    0.066 337    0.066 241    0.029 165    0.027 136    0.043  48
DCP14      .701        0.329     0.398  35     0.076 290    0.138 129    0.069  23    0.057 315    0.047 211    0.073 120    0.020  84    0.035   2
DCP15      .800        0.187     0.277  35     0.074 251    0.097 121    0.057  10    0.067 301    0.036 202    0.022  95    0.019  54    0.039 336
DCP16      .900       -0.028     0.141  31     0.069 245    0.063 170    0.060   7    0.060 296    0.032 168    0.023  68    0.018  31    0.027 293
DCP17      .969       -0.042     0.024  57     0.068 252    0.029 132    0.017   7    0.020 283    0.018 207    0.012  81    0.014  38    0.009 303
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                FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

      NATF HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.O       TEST POINT  CYCLES ANALYSED
      [illegible]  45.67       0.176        0.399       10.85        0.0           7.50         12179.4      20

      V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP     TDR          EXT DAMP
      [illegible]  46931.       0.448 07    -0.239       1.783        18.75        -0.00069      0.567        0.0
      [illegible]  1990.17
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            [illegible] [illegible] [illegible] [illegible] 0.194 [illegible] 0.043 138 0.026 235 0.076 131 0.039 211 0.009 229
CN               [illegible] [illegible] 7 0.221 [illegible] [illegible] 0.274 [illegible] 0.023 94 0.011 54 0.010 260 0.019 268 0.019 127
CM               [illegible] 0.076 [illegible] 0.765 74 0.741 [illegible] 0.027 [illegible] 0.014 200 0.006 109 0.004 171 0.006 36 0.004 306

DP 1   [illegible] [illegible]  .959 148    .288  12    .967 359   0.367 298   0.191 331   0.200 287   0.102 242   0.145 206   0.062 159
DP 2   [illegible] [illegible]  .959 359    .478  60    .718   0   0.291 317   0.118 335   0.154 337   0.151 253   0.140 206   0.056 171
DP 3   [illegible] [illegible]  [illegible] .327  50    .271 351   0.276 337   0.116 324   0.169 279   0.146 216   0.112 183   0.071 197
DP 4   [illegible] [illegible]  [illegible] 0.517  41   .428 360   0.160 313   0.122 299   0.118 249   0.192 175   0.062 138   0.038  89
DP 5   [illegible] [illegible]  [illegible] 1.023  12   0.290  33  0.368 237   0.355 319   0.297 117   0.294 206   0.224 167   0.253  99
DP 6   [illegible] [illegible]  1.443  13   0.198  26   0.277 318  0.107 290   0.092 249   0.086 181   0.069 138   0.049 103   0.066  38
DP 7   [illegible] [illegible]  1.178  15   0.740  11   0.217 101  0.113 258   0.108 192   0.077 119   0.062  95   0.037  57   0.044 356
DP 8   [illegible] [illegible]  .756  21    0.469  12   0.217 339  0.137 264   0.119 182   0.081 122   0.066 106   0.067  53   0.066   5
DP 9   [illegible] [illegible]  1.017  15   0.401 359   0.187 281  0.146 273   0.141 142   0.089  75   0.067  40   0.056 342   0.041 294
DP10   [illegible] [illegible]  1.208  19   0.148 344   0.297 270  0.183 206   0.137 125   0.088  55   0.051  17   0.062 312   0.039 265
DP11   [illegible] [illegible]  0.926  25   0.283 336   0.119 254  0.116 197   0.132 122   0.090  58   0.067  10   0.078 308   0.067 230
DP12   [illegible] [illegible]  .796  25    0.227 318   0.106 209  0.130 151   0.109  86   0.077  22   0.069 320   0.083 268   0.060 193
DP13   [illegible] [illegible]  0.773  26   0.295 290   0.158 176  0.116 138   0.134  68   0.065 341   0.061 291   0.077 233   0.064 155
DP14   [illegible] [illegible]  0.535  26   0.220 269   0.192 147  0.135  76   0.110   9   0.070 270   0.053 233   0.069 181   0.053 100
DP15   [illegible] [illegible]  0.401  23   0.705 256   0.167 119  0.125  63   0.137 330   0.066 239   0.033 190   0.030 139   0.036  97
DP16   [illegible] [illegible]  .227  12    0.137 237   0.098 122  0.065  45   0.056 308   0.038 217   0.015 177   0.019 127   0.026  33
DP17   [illegible] [illegible]  [illegible] 9  0.091 251  0.068 135  0.039  59   0.040 307   0.029 191   0.014  88   0.003 108   0.008  96

                FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

      NATF HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.O       TEST POINT  CYCLES ANALYSED
      0.0          87.10        0.256       0.439        11.60        0.0          -0.10         12187.1      20

      V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP     TDR          EXT DAMP
      136.2        48555.       0.548 07    -0.112       1.042        12.23        -0.00075      0.657        0.0
      447.0        1016.1
                                                          HARMONIC ANALYSIS
DATA
TYPE     X/C     RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            -0.0249   11.186   2   2.131 346   0.265 196   0.130 161   0.037  81   0.019 155   0.048 125   0.022 110   0.026 216
CN                0.118    0.888   6    0.189  28   0.008 352   0.007  18   0.016  93   0.010 130   0.007 135   0.001 244   0.003 238
CM               -0.0017   0.040 296    0.024 259   0.015 174   0.011 200   0.036 254   0.003 273   0.002 299   0.001 299   0.001  85

DP 1   [illegible] 0.160   6.804 351    0.894 264   0.918 235   0.291 323   0.039  22   0.196 245   0.255 308   0.080 318   0.009 174
DP 2   [illegible] 0.121   7.802 357    0.961 281   0.537 244   0.196 296   0.081  19   0.085 252   0.115 285   0.062  14   0.077  68
DP 3   [illegible] 0.069   3.655 352    0.961 345   0.263 231   0.166 295   0.112  29   0.086 123   0.069 167   0.016   5   0.039 140
DP 4   [illegible] 0.096   3.326 355    0.287   7   0.268 226   0.190 255   0.057 351   0.064 123   0.055 216   0.078 299   0.044  26
DP 5   [illegible] 0.117   2.256 356    0.426  23   0.165 154   0.149 213   0.063 286   0.043  53   0.061 134   0.055 216   0.042 279
DP 6   [illegible] 0.168   1.776 356    0.441  23   0.146 119   0.130 170   0.047 244   0.025   9   0.057 104   0.049 177   0.044 239
DP 7   [illegible] 0.176   1.469   3    0.404  30   0.121 103   0.107 171   0.055 224   0.031 333   0.039  93   0.051 167   0.049 209
DP 8   [illegible] 0.137   1.279 358    0.393  18   0.117  66   0.397 121   0.355 162   0.017 242   0.027  36   0.034  86   0.032 131
DP 9   [illegible] 0.110   1.061 359    0.345  12   0.111  35   0.083  87   0.063 134   0.038 206   0.023 307   0.039  17   0.036  86
DP10   [illegible] 0.120   0.824  15    0.272  32   0.098  29   0.072  80   0.070 136   0.037 199   0.015 284   0.029  23   0.021  92
DP11   .571        0.158   0.635  23    0.176  39   0.076 333   0.075  15   0.367  83   0.030 134   0.018 194   0.022 289   0.028 327
DP12   [illegible] 0.124   0.486  33    0.142  48   0.060 330   0.048   6   0.033  58   0.021 103   0.013 169   0.016 228   0.022 273
DP13   [illegible] 0.198   0.365  41    0.117  64   0.063 310   0.058 345   0.037  55   0.026  88   0.026 125   0.018 176   0.021 234
DP14   .800        0.094   0.244  58    0.089  76   0.036 338   0.032 340   0.024  19   0.023  69   0.015  99   0.011  97   0.005 220
DP15   .900       -0.057   0.141  83    0.066  91   0.022 334   0.026   0   0.007 357   0.007  35   0.006  67   0.003 331   0.004  72
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                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                 0.0         68.53        0.259       0.400       11.65         0.0          2.49        12187.2      20

               V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                134.6         47646.      0.64E 07   -0.105        1.264        15.12       -0.00089      0.997        0.0
               (441.5)       (995.1)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.493  11.655   0    2.159 349    0.290 184    0.119 163    0.018 148    0.022 150    0.031 139    0.026 118    0.012 212
CN                  0.329   0.857  10    0.105  15    0.029 202    0.016 308    0.038 200    0.005  73    0.004 209    0.004 201    0.003 189
CM                 -0.012   0.079  98    0.019 290    0.035 271    0.011 158    0.005  27    0.002 276    0.001 104    0.002  15    0.000 345

DCP 1     .010      0.665   4.595 344    0.840   1    0.655 288    0.573 255    0.359  65    0.401  50    0.125 111    0.051 104    0.057 269
DCP 2     .020      0.634   4.075 353    0.808   5    0.315 288    0.327 236    0.131 121    0.177  54    0.073  52    0.040 291    0.071 254
DCP 3     .030      0.781   3.340 352    0.774 359    0.171 248    0.257 195    0.127  95    0.132  23    0.051 256    0.097 230    0.020 249
DCP 4     .049      0.518   3.122 353    0.624 353    0.122 212    0.177 178    0.021 114    0.111 316    0.039 302    0.042  88    0.044 115
DCP 5     .099      0.835   2.104 356    0.456 359    0.073 208    0.087 151    0.011  75    0.070 264    0.024 220    0.023  44    0.027  78
DCP 6     .145      0.640   1.632 359    0.347 353    0.089 185    0.073 110    0.025 342    0.055 234    0.030 177    0.008  34    0.018  18
DCP 7     .200      0.533   1.362   8    0.255   3    0.087 199    0.047  77    0.033 358    0.035 229    0.039 184    0.004 215    0.013 355
DCP 8     .250      0.483   1.175   5    0.203 359    0.075 162    0.051  24    0.039 274    0.040 174    0.019 143    0.001 278    0.018 317
DCP 9     .300      0.430   0.587   7    0.180   1    0.060 151    0.057   0    0.034 261    0.039 146    0.026 102    0.012 330    0.018 202
DCP10     .395      0.362   0.797  24    0.140  37    0.036 169    0.052 352    0.037 251    0.025 138    0.010  17    0.010 297    0.017 191
DCP11     .501      0.266   0.638  31    0.122  50    0.018 157    0.057 335    0.029 217    0.032 108    0.013 347    0.028 237    0.024 211
DCP12     .600      0.228   0.507  42    0.118  53    0.010 180    0.033 330    0.023 215    0.015  56    0.012 285    0.011 191    0.007 188
DCP13     .701      0.251   0.391  53    0.106  55    0.016 211    0.043 321    0.018 184    0.023  54    0.016 258    0.019 177    0.005 295
DCP14     .800      0.112   0.280  64    0.073  66    0.009  83    0.033 327    0.017 165    0.013  15    0.005 255    0.009  92    0.006  92
DCP15     .900     -0.063   0.148  76    0.048 113    0.016  54    0.031 285    0.018 139    0.006 327    0.004 188    0.007 187    0.014  33


                          FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

               TUNED HZ     DRIVE HZ     K           MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
                 0.0         69.94        0.267       0.397       11.66         0.0          5.00        12187.3      20

               V            Q            RN          CM(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                133.4         46927.      0.64E 07   -0.122        1.515        17.91       -0.00062      0.691        0.0
               (437.7)       (980.1)
                                                                HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               5.001  11.667   0    2.356 349    0.240 160    0.100 163    0.033 164    0.015 176    0.037 160    0.033 127    0.036 189
CN                  0.516   0.908  14    0.162 356    0.037 156    0.011  24    0.017 269    0.011 145    0.008 260    0.001 280    0.005 136
CM                 -0.025   0.062 256    0.038   2    0.028 268    0.018 158    0.012  59    0.008 301    0.006 168    0.004  84    0.006 340

DCP 1     .010      1.064   4.423 344    1.722  23    0.690 351    0.425 240    0.253 182    0.065 165    0.145 138    0.074  91    0.044 358
DCP 2     .020      1.129   3.318 357    1.273  29    0.568 334    0.355 259    0.196 191    0.117 136    0.083 142    0.060  87    0.078  38
DCP 3     .030      1.157   2.823 358    1.182  22    0.524 314    0.296 233    0.133 169    0.089 142    0.118 112    0.111  28    0.082 323
DCP 4     .049      1.297   2.677   0    0.885   9    0.314 294    0.201 210    0.096 141    0.061  93    0.028  66    0.042 348    0.037 316
DCP 5     .099      1.223   1.943   5    0.670 359    0.222 252    0.130 163    0.061  98    0.057  59    0.057 324    0.047 276    0.021 237
DCP 6     .149      0.966   1.624   7    0.513 346    0.208 217    0.115 130    0.079  68    0.067   5    0.079 264    0.038 162    0.010  66
DCP 7     .200      0.824   1.431  16    0.412 346    0.214 215    0.123 138    0.080  76    0.104   4    0.100 280    0.058 265    0.033 141
DCP 8     .250      0.741   1.305  12    0.337 328    0.207 183    0.115 101    0.099  24    0.102 310    0.100 219    0.053 132    0.053  60
DCP 9     .300      0.686   1.157  17    0.252 316    0.175 156    0.106  83    0.110   1    0.102 269    0.090 183    0.047  99    0.046  36
DCP10     .399      0.573   0.962  24    0.132 326    0.162 165    0.120  73    0.126 346    0.102 249    0.056 173    0.047 105    0.045  40
DCP11     .501      0.434   0.790  29    0.056 295    0.161 135    0.130  34    0.140 289    0.113 182    0.044 100    0.054  27    0.065 289
DCP12     .600      0.356   0.621  35    0.036 202    0.142 109    0.127 354    0.117 254    0.089 145    0.054  47    0.060 349    0.075 237
DCP13     .701      0.348   0.456  42    0.086 163    0.136  69    0.099 312    0.096 211    0.084 138    0.056 348    0.061 273    0.087 168
DCP14     .800      0.201   0.294  41    0.128 156    0.114  43    0.088 290    0.063 184    0.059  72    0.050 332    0.042 239    0.050 129
DCP15     .900     -0.025   0.142  44    0.091 155    0.084  32    0.068 270    0.053 158    0.042  28    0.033 291    0.035 197    0.032  70
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ      DRIVE HZ      K              MACH NO        DEL.ALPHA    DEL.H        ALPHA.O       TEST POINT   CYCLES ANALYSED
            0.0          70.78         0.271          0.396         11.59         0.0           7.57        12187.4        20

          V             Q             RN             CM(MIN)        CN(MAX)      ALPHA,NMAX   AERO DAMP     TDR          EXT DAMP
           133.0          46722.       0.63E 07      -0.219          1.802        20.49       -0.00013       0.107        0.0
          (436.2)        (975.8)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA               7.576    11.990   0     2.469 346     0.134 137     0.073 138     0.056 158     0.027 153     0.030 137     0.032  96     0.048 166
CN                  0.744     0.940  15     0.150 355     0.012 136     0.013 215     0.013 108     0.019 318     0.014 171     0.010  33     0.011 187
CM                 -0.080     0.074 157     0.077   8     0.039 258     0.011 144     0.032 154     0.007  89     0.011 308     0.038 176     0.006  10

DCP 1     .010      1.970     2.672 351     2.095  30     0.647 336     0.152 284     0.164 284     0.191 229     0.111 191     0.047 147     0.018 167
DCP 2     .020      1.969     2.351   5     1.701  36     0.540 335     0.130 286     0.113 307     0.155 255     0.102 207     0.057 154     0.038 138
DCP 3     .030      1.583     2.026   6     1.488  32     0.493 326     0.156 281     0.115 275     0.148 225     0.091 172     0.062 125     0.058  90
DCP 4     .045      1.823     2.156   5     1.029  25     0.368 339     0.272 280     0.204 208     0.109 136     0.031  38     0.031 126     0.036  55
DCP 5     .055      1.594     1.714  13     0.808   7     0.197 282     0.122 252     0.160 188     0.134 124     0.082  16     0.023 343     0.030 331
DCP 6     .140      1.250     1.570  16     0.667 352     0.207 247     0.114 212     0.151 146     0.115  55     0.073 332     0.026 279     0.018 276
DCP 7     .200      1.075     1.425  24     0.599 354     0.253 250     0.153 200     0.150 143     0.111  67     0.084  12     0.053 309     0.024 258
DCP 8     .250      0.971     1.337  20     0.521 335     0.270 223     0.195 152     0.155  82     0.117  13     0.098 307     0.067 229     0.028 171
DCP 9     .300      0.983     1.200  20     0.449 328     0.281 209     0.214 128     0.147  52     0.105 341     0.091 281     0.065 190     0.025 108
DCP10     .355      0.812     1.115  26     0.295 318     0.268 199     0.223 117     0.156  33     0.109 328     0.110 265     0.111 173     0.063  93
DCP11     .531      0.715     0.984  15     0.202 249     0.227 147     0.164  71     0.128 346     0.124 278     0.159 190     0.131  86     0.050 348
DCP12     .600      0.651     0.823  12     0.299 202     0.269  95     0.139 356     0.082 294     0.113 248     0.172 146     0.166  33     0.100 272
DCP13     .731      0.580     0.575  11     0.328 177     0.281  62     0.157 310     0.076 218     0.347 178     0.169 103     0.115 338     0.109 200
DCP14     .833      0.341     0.355  11     0.278 163     0.218  43     0.148 286     0.084 179     0.029  59     0.041  62     0.050 295     0.053 153
DCP15     .900      0.066     0.184 354     0.196 148     0.150  11     0.085 242     0.032 116     0.008 170     0.047  31     0.045 243     0.034  88


                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

          TUNED HZ      DRIVE HZ      K              MACH NO        DEL.ALPHA    DEL.H        ALPHA.O       TEST POINT   CYCLES ANALYSED
            0.0          22.97         0.070          0.497         10.36         0.0           0.00        12189.1        20

          V             Q             RN             CM(MIN)        CN(MAX)      ALPHA,NMAX   AERO DAMP     TDR          EXT DAMP
           167.2          73621.       0.80E 07      -0.071          1.187        10.60       -0.00095       1.260        0.0
          (548.6)        (1537.6)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0     RES 1 PHI     RES 2 PHI     RES 3 PHI     RES 4 PHI     RES 5 PHI     RES 6 PHI     RES 7 PHI     RES 8 PHI     RES 9 PHI

ALPHA               0.004    10.365   0     0.958 351     0.151 325     0.060  17     0.055 141     0.034 125     0.051 189     0.024 128     0.017   3
CN                  0.180     0.940   1     0.034  16     0.075 247     0.026 231     0.021 355     0.010 304     0.010 167     0.002  20     0.004  10
CM                 -0.007     0.030 314     0.019 266     0.010 335     0.011  27     0.010 113     0.003 121     0.003 296     0.000  97     0.002 115

DCP 1     .010      0.387     4.606 353     1.035 262     0.962 320     0.127 332     0.082 183     0.259  41     0.017  95     0.037  35     0.051  40
DCP 2     .020      0.469     4.229 357     0.862 270     0.567 309     0.142  21     0.139 153     0.159  82     0.055  41     0.079 233     0.022  31
DCP 3     .030      0.629     4.188 356     0.542 276     0.331 281     0.143  40     0.128 149     0.082 103     0.084  34     0.073 255     0.009 187
DCP 4     .049      0.635     3.534 357     0.456 280     0.405 278     0.113  49     0.186 120     0.049  97     0.088  33     0.084 247     0.087 202
DCP 5     .074      0.463     2.803 357     0.136 352     0.296 279     0.060 247     0.153 103     0.029 329     0.044 287     0.027 195     0.028 226
DCP 6     .099      0.475     2.380 358     0.076  21     0.247 263     0.048 314     0.140  75     0.046 273     0.081 257     0.047 127     0.034 105
DCP 7     .149      0.312     1.965 358     0.104  47     0.159 233     0.048 273     0.081  32     0.035 254     0.058 224     0.034  76     0.035  56
DCP 8     .200      0.259     1.533   0     0.083  38     0.138 273     0.029 268     0.084  15     0.033 268     0.049 219     0.028  62     0.031  65
DCP 9     .250      0.220     1.356 358     0.079  40     0.133 196     0.016 234     0.084 335     0.064 234     0.041 165     0.039  33     0.026   3
DCP10     .300      0.205     1.129 359     0.099  43     0.108 192     0.025 217     0.066 329     0.028 241     0.033 168     0.028   9     0.023   6
DCP11     .399      0.189     0.866   4     0.073  56     0.062 210     0.042 233     0.051 321     0.009 314     0.023 136     0.011 346     0.008 338
DCP12     .501      0.138     0.616   7     0.066  63     0.047 225     0.046 224     0.034 315     0.013 336     0.013 128     0.010 325     0.004 329
DCP13     .600      0.141     0.448  11     0.066  67     0.039 233     0.050 217     0.027 307     0.016 331     0.011 137     0.005 298     0.008 336
DCP14     .701      0.202     0.285  17     0.076  75     0.033 242     0.050 219     0.022 307     0.020 346     0.014 112     0.004 191     0.008 275
DCP15     .800      0.089     0.157  27     0.053  78     0.022 225     0.043 202     0.024 286     0.019 309     0.009  97     0.003 136     0.007 250
DCP16     .900     -0.074     0.051  67     0.018 157     0.029 179     0.027 191     0.025 275     0.011 277     0.006  81     0.005 202     0.004 261
DCP17     .949     -0.050     0.019 144     0.016 103     0.030 170     0.012 200     0.016 277     0.004 209     0.037  96     0.006 207     0.004 292
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                    FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

        TUNED HZ     DRIVE HZ     K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.O      TEST POINT    CYCLES ANALYSED
          0.0         23.00       0.370        0.495      10.92         0.0          2.49       12181.2        20

        V            Q            RN          CN(MIN)     CN(MAX)      ALPHA,MMAX  AERO DAMP    TDR           EXT DAMP
         166.2        73003.       3.79E 07   -0.368       1.326        12.75       -0.30093     1.238          0.0
        (545.3)      (1524.7)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              2.499   15.323   0   0.985 351    0.153 328    0.015 295    0.046 201    0.001 118    0.048 265    0.019 181    0.028  44
CN                 0.321    0.867   1   0.176  31    0.107 300    0.059 222    0.017 122    0.018  40    0.076 299    0.009 262    0.005 136
CM                -0.016    0.033 105   0.038 100    0.018  39    0.013 300    0.011 207    0.009 133    0.005  97    0.003  25    0.003 311

DCP 1     .010     5.820    4.836 351   0.370  46    1.026 356    0.635 329    0.213 163    0.118 159    0.117 125    0.076  82    0.079  38
DCP 2     .020     0.764    4.194 353   0.676  50    0.725 351    0.492 303    0.340 199    0.213 146    0.069 147    0.062  49    0.036 325
DCP 3     .030     0.787    3.460 353   0.569  55    0.511   2    0.477 297    0.349 239    0.237 151    0.039 136    0.001  69    0.051 354
DCP 4     .049     0.876    3.165 355   0.697  46    0.479 356    0.356 272    0.192 191    0.182 146    0.056 201    0.038  91    0.089  42
DCP 5     .076     0.818    2.440 356   0.671  41    0.296 344    0.299 262    0.109 251    0.106 112    0.080 165    0.071 332    0.083  69
DCP 6     .099     0.785    2.140 356   0.556  42    0.226 322    0.231 238    0.073 275    0.073  81    0.032  66    0.015 330    0.030 322
DCP 7     .149     0.612    1.667 358   0.400  32    0.186 297    0.191 220    0.060 152    0.090  56    0.051   8    0.038 296    0.033 268
DCP 8     .200     0.509    1.329   1   0.315  31    0.166 301    0.160 221    0.253 148    0.071  59    0.069  17    0.030 331    0.037 260
DCP 9     .299     0.462    1.162   0   0.256  19    0.146 280    0.122 195    0.060 112    0.068  29    0.056 331    0.040 268    0.039 202
DCP10     .400     0.407    0.962   1   0.210  19    0.126 277    0.091 188    0.050  95    0.052  17    0.039 319    0.028 248    0.020 196
DCP11     .499     0.344    0.753   6   0.198  23    0.107 283    0.082 187    0.044  77    0.035 359    0.036 290    0.017 236    0.014 164
DCP12     .501     0.297    0.567   8   0.121  22    0.090 276    0.068 176    0.038  58    0.030 347    0.075 281    0.015 325    0.015 151
DCP13     .600     0.227    0.409  16   0.085  27    0.085 271    0.061 165    0.036  46    0.029 325    0.023 276    0.036 225    0.011 131
DCP14     .701     0.259    0.256  20   0.077  55    0.068 269    0.050 150    0.035  25    0.026 332    0.016 249    0.008 209    0.015 120
DCP15     .800     0.136    0.163  39   0.031   7    0.055 263    0.050 119    0.033  12    0.023 297    0.016 260    0.009 180    0.013 109
DCP16     .900    -0.052    0.371  51   0.063 246    0.055 225    0.026 116    0.023   5    0.021 306    0.016 272    0.009 190    0.012  87
DCP17     .969    -0.338    0.326 141   0.330 261    0.333 219    0.011 146    0.011  41    0.019 333    0.016 273    0.003 331    0.008  98


                    FORCED  PITCHING  OSCILLATION             AIRFOIL     NLR 1

        TUNED HZ     DRIVE HZ     K           MACH NO     DEL.ALPHA    DEL.H       ALPHA.O      TEST POINT    CYCLES ANALYSED
          0.0         29.01       0.371        0.496      10.22         0.0          4.93       12181.3        20

        V            Q            RN          CN(MIN)     CN(MAX)      ALPHA,MMAX  AERO DAMP    TDR           EXT DAMP
         165.6        72721.       3.79E 07   -0.136       1.661        13.99       -0.00009     1.256          0.0
        (543.3)      (1518.8)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              4.934   10.216   0   0.966 352    0.126 327    0.365  17    0.025 329    0.110 294    0.110 112    0.057  57    0.036 322
CN                 0.464    0.726   3   0.256  46    0.096 323    0.037 276    0.081 260    0.020 190    0.025  63    0.012  17    0.011 313
CM                 0.016    0.030 261   0.023 110    0.022  37    0.008 316    0.017 339    0.006 290    0.037 236    0.006 146    0.005  86

DCP 1     .010     1.812    4.335 340   1.414  62    0.716 350    0.943 329    0.142   3    0.196 200    0.114 221    0.070 234    0.038 349
DCP 2     .020     1.256    3.632 351   1.167  67    0.717   8    0.325 339    0.136 316    0.230 260    0.292 192    0.360 203    0.036 150
DCP 3     .033     1.208    3.256 350   1.071  70    0.003  22    0.314 340    0.125 206    0.240 279    0.113 223    0.360 156    0.081 141
DCP 4     .044     1.313    2.471 356   1.327  91    0.470 356    0.216 337    0.226 277    0.145 252    0.023 197    0.076 152    0.060 141
DCP 5     .076     1.300    1.771 353   0.414  99    0.414  19    0.153 244    0.203 292    0.016  36    0.131 169    0.036 273    0.080  62
DCP 6     .095     1.144    1.617 358   0.304  44    0.305 346    0.171 245    0.097 256    0.079 211    0.044 111    0.058  97    0.027  83
DCP 7     .146     0.604    1.735   1   0.367  38    0.217 327    0.144 277    0.047 230    0.076 176    0.065 103    0.043  99    0.036  14
DCP 8     .233     0.726    1.304   4   0.347  37    0.164 326    0.073 208    0.044 240    0.044 102    0.043 106    0.043  62    0.032  13
DCP 9     .250     0.644    0.975   5   0.138  28    0.143 314    0.076 244    0.044 236    0.033 143    0.056  77    0.048  35    0.035 334
DCP10     .333     0.504    0.617       0.296  24    0.124 303    0.059 293    0.034 16     0.052 138    0.052  72    0.038  23    0.034 315
DCP11     .344     0.461    0.446  13   0.239  24    0.395 247    0.038 267    0.339 233    0.029 137    0.365  63    0.031  31    0.031 326
DCP12     .531     0.372    0.348   1   0.161  18    0.371 274    0.015 290    0.340 207    0.020 123    0.037  65    0.023   6    0.024 306
DCP13     .630     0.313    0.417  17   0.153  14    0.344 204    0.313 142    0.317 146    0.330 132    0.031  48    0.019 362    0.321 283
DCP14     .731     0.316    0.270  24   0.122  10    0.059 244    0.020 126    0.312 137    0.026  63    0.025  23    0.016 305    0.021 250
DCP15     .830     0.176    0.213  25   0.086 342    0.064 228    0.025 133    0.017 117    0.027  61    0.020   6    0.016 252    0.018 244
DCP16     .933    -0.031    0.122  23   0.364 295    0.367 226    0.014 157    0.316 116    0.021  56    0.013  11    0.013 208    0.017 227
DCP17     .964    -0.038    0.021  57   0.344 283    0.323 226    0.017 174    0.336 195    0.006  73    0.313  34    0.010 317    0.011 249
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNNEL HZ    DRIVE HZ    K          MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0         23.06       0.071      0.493       10.26        0.0          7.49      12187.4        20

            V            Q           RN          CM(MIN)      CM(MAX)     ALPHA,NMAX  AERO DAMP    TOR          EXT DAMP
             165.1        72213.      0.79E 07   -0.150        1.558       14.69      -0.33194     1.369         0.0
            (541.6)      (1508.2)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                7.496   10.296   0   0.968 357   0.125 357   0.084  56   0.065 348   0.089 338   0.271 212   0.100 113   0.043  56
CN                   0.692    0.585  10   0.288  40   0.079  11   0.054 342   0.098 287   0.023 291   0.065 192   0.019 145   0.016  98
CM                  -0.023    0.049 239   0.033 121   0.016  56   0.013  78   0.014   3   0.009 353   0.019 325   0.011 262   0.007 231

DCP 1     .010       2.053    2.084 345   1.875  68   0.511  53   0.928  55   0.286 353   0.196   1   0.098 310   0.071 262   0.031 253
DCP 2     .020       1.866    2.320 351   1.940  72   0.949  27   0.248  55   0.329  11   0.149 340   0.123 348   0.150 272   0.026 311
DCP 3     .030       1.816    1.985 349   1.308  76   0.569  35   0.247  35   0.314  15   0.226 323   0.070   7   0.196 289   0.063 215
DCP 4     .049       1.804    1.678   9   1.185  60   0.361  76   0.303  29   0.206 352   0.190 343   0.119 273   0.058 270   0.362 267
DCP 5     .074       1.789    1.061 356   0.867  45   0.444  46   0.122 108   0.378 309   0.338  10   0.167 195   0.211 255   0.125   3
DCP 6     .099       1.668    1.134   3   0.786  56   0.211  27   0.183  20   0.130 331   0.093 317   0.096 248   0.071 223   0.046 197
DCP 7     .149       1.159    0.481   8   0.599  65   0.161   7   0.143 357   0.109 334   0.078 285   0.105 275   0.068 195   0.058 175
DCP 8     .200       0.993    0.868  10   0.456  68   0.141  17   0.118 352   0.078 302   0.068 290   0.100 226   0.054 194   0.052 170
DCP 9     .250       0.857    0.701  10   0.381  59   0.123   7   0.112 331   0.081 280   0.070 253   0.093 197   0.062 155   0.061 132
DCP10     .300       0.770    0.698  11   0.315  33   0.093   2   0.095 325   0.063 265   0.050 245   0.079 190   0.069 135   0.038 123
DCP11     .399       0.653    0.617  17   0.259  29   0.052 350   0.069 326   0.051 256   0.036 239   0.067 197   0.047 176   0.033 118
DCP12     .501       0.505    0.516  20   0.203  18   0.031 328   0.054 312   0.043 234   0.025 220   0.057 182   0.044 110   0.027  91
DCP13     .600       0.417    0.429  25   0.173   9   0.026 288   0.044 301   0.040 215   0.022 209   0.069 171   0.042  96   0.025  76
DCP14     .701       0.401    0.308  31   0.145 359   0.030 262   0.036 285   0.043 193   0.020 165   0.039 150   0.037  74   0.027  49
DCP15     .800       0.265    0.262  28   0.113 336   0.033 268   0.045 259   0.048 176   0.019 149   0.035 137   0.038  71   0.031  52
DCP16     .900       0.302    0.176  21   0.086 311   0.037 267   0.041 266   0.032 174   0.022 167   0.029 118   0.028  68   0.027  25
DCP17     .969      -0.036    0.069  28   0.065 300   0.019 287   0.021 258   0.011 196   0.011 200   0.017 133   0.014  83   0.013  26
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                    FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1

            TUNNEL HZ    DRIVE HZ    K          MACH NO      DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT   CYCLES ANALYSED
            [illegible]  [illegible] [illegible] [illegible] [illegible]  0.0         -0.63       12163.1        20

            V            Q           RN          CM(MIN)      CM(MAX)     ALPHA,NMAX  AERO DAMP    TOR          EXT DAMP
             199.2        103910.    [illegible] [illegible]  [illegible]  9.73       [illegible]  1.574         0.0
            (653.6)      (2170.2)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C        RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              [illegible]                                    0.059  82   0.059  40   0.022 117   0.102 241   0.043  92   0.032 209
CN                 [illegible]                                    0.028 205   0.020 104   0.005   7   0.013 266   0.004 198   0.008  32
CM                 [illegible]                                    0.011 345   0.006 159   0.003  98   0.004  26   0.001 227   0.001 184

DCP 1              [illegible]                                    0.188 192   0.155 201   0.077  16   0.046 275   0.071 319   0.021 248
DCP 2              [illegible]                                    0.087 348   0.084 249   0.110  22   0.035   4   0.050 296   0.025  65
DCP 3              [illegible]                                    0.095  28   0.069 171   0.062  27   0.029  66   0.069 328   0.028  59
DCP 4              [illegible]                                    0.136  28   0.088 115   0.012  48   0.045  75   0.031 214   0.003  94
DCP 5              [illegible]                                    0.154 207   0.153 145   0.040 180   0.039  46   0.013 360   0.030 198
DCP 6              [illegible]                                    0.121 200   0.155 144   0.061 161   0.038 339   0.022  70   0.014 340
DCP 7              [illegible]                                    0.080 249   0.067 127   0.032 124   0.049 341   0.014  36   0.010 330
DCP 8              [illegible]                                    0.084 177   0.041  74   0.053  45   0.009 201   0.023 235   0.016  88
DCP 9              [illegible]                                    0.081 164   0.050  49   0.026 349   0.062 261   0.027 261   0.023  61
DCP10              [illegible]                                    0.040 179   0.034  20   0.019 313   0.021 240   0.041 177   0.016  35
DCP11              [illegible]                                    0.046 162   0.027  28   0.013 269   0.029 236   0.064 161   0.015  32
DCP12              [illegible]                                    0.046 174   0.010  12   0.012 280   0.018 214   0.008 131   0.006 240
DCP13              [illegible]                                    0.038 170   0.015 308   0.016 256   0.013 163   0.005  94   0.008 350
DCP14              [illegible]                                    0.034 188   0.014 218   0.011 272   0.016 192   0.002 126   0.008 335
DCP15              [illegible]                                    0.035 157   0.019 244   0.005 289   0.007 136   0.010 190   0.003 224
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

        TUNNEL HZ    DRIVE HZ     K            MACH NO      OSC.ALPHA    OSC.M    ALPHA.O      TEST POINT   CYCLES ANALYZED
        [illegible]  [illegible]  [illegible]  [illegible]  10.22        0.0      [illegible]  [illegible]  [illegible]

        V            Q            RN           CMMIN        CNMAX        ALPHA,CNMAX  AERO DAMP    TSA          LAT DAMP
         198.3        103321.     [illegible]  [illegible]  [illegible]   11.47       -0.00107      1.007        0.0
        (650.6)      (2157.9)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA    [illegible]
CN       [illegible]
CM       [illegible]

DCP 1    [illegible]
DCP 2    [illegible]
DCP 3    [illegible]
DCP 4    [illegible]
DCP 5    [illegible]
DCP 6    [illegible]
DCP 7    [illegible]
DCP 8    [illegible]
DCP 9    [illegible]
DCP10    [illegible]
DCP11    [illegible]
DCP12    [illegible]
DCP13    [illegible]
DCP14    [illegible]
DCP15    [illegible]
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

        TUNNEL HZ    DRIVE HZ     K            MACH NO      OSC.ALPHA    OSC.M    ALPHA.O      TEST POINT   CYCLES ANALYZED
        [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  0.0      [illegible]  [illegible]  [illegible]

        V            Q            RN           CMMIN        CNMAX        ALPHA,CNMAX  AERO DAMP    TSA          LAT DAMP
         197.4        102808.     [illegible]  [illegible]  [illegible]   12.71       [illegible]  [illegible]  [illegible]
        (647.8)      (2147.2)
                                                    HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA    [illegible]
CN       [illegible]
CM       [illegible]

DCP 1    [illegible]
DCP 2    [illegible]
DCP 3    [illegible]
DCP 4    [illegible]
DCP 5    [illegible]
DCP 6    [illegible]
DCP 7    [illegible]
DCP 8    [illegible]
DCP 9    [illegible]
DCP10    [illegible]
DCP11    [illegible]
DCP12    [illegible]
DCP13    [illegible]
DCP14    [illegible]
DCP15    [illegible]
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
            [illegible] 23.17        [illegible]  [illegible]  10.2?        0.0          0.01         12185.1      20

            V           C            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
            228.1       128846.      [illegible]  [illegible]  [illegible]  9.31         -0.00125     2.28?        0.0
            (748.4)     (2691.0)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             [illegible] [illegible] [illegible] [illegible] [illegible]  0.058 269    0.118 224    0.008 291    0.098  12    0.037 320
CN                [illegible] [illegible] [illegible] [illegible]  0.052 207   0.024 189    0.011 196    0.004 345    0.007  45    0.009 322
CM                [illegible] [illegible] [illegible] [illegible]  0.015  17   0.000 211    0.007 205    0.003  77    0.004 14?    0.005 160

DCP 1  [illegible] [illegible] [illegible] [illegible] [illegible]  0.145 33?   0.120 308    0.027 240    0.007 270    0.043  13    0.050 263
DCP 2  [illegible] [illegible] [illegible] [illegible] [illegible]  0.136   1   0.165 331    0.026 318    0.072 290    0.082   7    0.029 218
DCP 3  [illegible] [illegible] [illegible] [illegible] [illegible]  0.101  28   0.110 308    0.003 341    0.004 331    0.074   8    0.002 286
DCP 4  [illegible] [illegible] [illegible] [illegible] [illegible]  0.197  19   0.009 342    0.075 351    0.052 341    0.006  17    0.030  95
DCP 5  [illegible] [illegible] [illegible] [illegible] [illegible]  0.014   8   0.036  51    0.054 256    0.081  26    0.050  44    0.040  73
DCP 6  [illegible] [illegible] [illegible] [illegible] [illegible]  0.167 332   0.063 137    0.073 208    0.072  26    0.074 102    0.019  19
DCP 7  [illegible] [illegible] [illegible] [illegible] [illegible]  0.153 291   0.161 156    0.177 290    0.047  64    0.062 100    0.035 288
DCP 8  [illegible] [illegible] [illegible] [illegible] [illegible]  0.187 262   0.038 136    0.191 269    0.076 127    0.041 122    0.032  78
DCP 9  [illegible] [illegible] [illegible] [illegible] [illegible]  0.178 277   0.074 172    0.128 199    0.084 150    0.074  76    0.035  86
DCP10  [illegible] [illegible] [illegible] [illegible] [illegible]  0.166 283   0.059 142    0.039 182    0.038 222    0.071  56    0.011 286
DCP11  [illegible] [illegible] [illegible] [illegible] [illegible]  0.072 252   0.039 142    0.038 115    0.018 227    0.055  31    0.060 328
DCP12  [illegible] [illegible] [illegible] [illegible] [illegible]  0.061 219   0.024 142    0.042  67    0.007   4    0.043   6    0.037 311
DCP13  [illegible] [illegible] [illegible] [illegible] [illegible]  0.046 182   0.011 113    0.037  77    0.017 310    0.027 322    0.032 294
DCP14  [illegible] [illegible] [illegible] [illegible] [illegible]  0.042 184   0.014  86    0.003  42    0.019 363    0.021 206    0.016 234
DCP15  [illegible] [illegible] [illegible] [illegible] [illegible]  0.156 177   0.020 114    0.028  45    0.019 291    0.027 202    0.014 258
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

            TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT  CYCLES ANALYSED
             0.0         23.21        0.352        0.700       10.23         0.0           2.42       12185.2      20

            V           C            RN           CM(MIN)      CN(MAX)      ALPHA,NMAX   AERO DAMP    TDR          EXT DAMP
             227.1       127936.      0.10E 08    -0.108        1.308        10.73       -0.00129      2.324        0.0
            (745.1)     (2672.0)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             2.411     10.232   0    0.904 358    0.170 342    0.126  53    0.086 359    0.036 214    0.127 205    0.048 108    0.064  52
CN                0.273      0.924   0    0.244  44    0.066 315    0.071 297    0.037 249    0.012 176    0.018 202    0.013 146    0.011  57
CM               -0.031      0.038 268    0.022 115    0.012  42    0.013  56    0.011  18    0.002 241    0.003 314    0.005 235    0.005 210

DCP 1    .010    -0.093      3.990 350    0.443  32    0.494 323    0.256 349    0.069 287    0.112 344    0.076  84    0.025   1    0.044  28
DCP 2    .020     0.014      3.331 353    0.444  36    0.351 325    0.252 357    0.026 283    0.079   0    0.090  95    0.043  82    0.038  48
DCP 3    .030     0.108      3.124 352    0.515  40    0.273 325    0.239   2    0.063 144    0.037  24    0.052  52    0.043  97    0.029  51
DCP 4    .049     0.351      2.969 352    0.626  43    0.155 317    0.192  21    0.101 120    0.019  28    0.064  86    0.053 135    0.009 262
DCP 5    .099     0.587      2.467 351    0.727  58    0.129 353    0.185 345    0.067 129    0.089 159    0.035 130    0.051 142    0.056 219
DCP 6    .149     0.527      1.998 351    0.777  67    0.147 347    0.156 307    0.068 313    0.080 170    0.097 242    0.016 245    0.052 213
DCP 7    .200     0.453      1.905 357    0.716  71    0.142 313    0.173 300    0.234 323    0.100 164    0.138 266    0.046 272    0.022  43
DCP 8    .250     0.438      1.291 359    0.502  55    0.172 338    0.112 284    0.182 292    0.060 206    0.106 265    0.073 197    0.013  13
DCP 9    .300     0.391      1.124   2    0.306  43    0.120 358    0.140 278    0.120 282    0.065 243    0.065 226    0.086 211    0.034  99
DCP10    .399     0.326      0.884   7    0.244  33    0.028  11    0.099 266    0.064 251    0.028 320    0.034 171    0.042 214    0.034  78
DCP11    .501     0.281      0.675  12    0.172  15    0.037 303    0.074 271    0.071 223    0.016 288    0.032 151    0.027 121    0.024  74
DCP12    .600     0.260      0.909  17    0.136   0    0.056 278    0.055 273    0.068 203    0.009 183    0.028 152    0.041  90    0.032  57
DCP13    .701     0.303      0.320  27    0.102 354    0.062 239    0.038 269    0.052 196    0.017  86    0.018 120    0.039  62    0.025  27
DCP14    .800     0.199      0.221  28    0.075 311    0.061 232    0.038 250    0.045 169    0.029  73    0.010  75    0.030  35    0.018 337
DCP15    .900    -0.038      0.111  35    0.083 273    0.061 238    0.041 240    0.036 167    0.016  94    0.009  79    0.027  32    0.015 357
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                          FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                 TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H      ALPHA.O     TEST POINT  CYCLES ANALYSED
                  C.0         23.20       0.052       0.698      10.17        0.0         4.97      12185.3      20

                 V           Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX AERO DAMP   TDR         EXT DAMP
                  226.0       127256.     0.10E 08   -0.134       1.376       11.69     -0.00142     2.562       0.0
                 (741.6)     (2657.8)
                                                                  HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA                4.970   10.171   0   0.915   4   0.105 343   0.095  70   0.066  87   0.066   7   0.056 337   0.070 197   0.037 171
CN                   0.451    0.787   1   0.300  41   0.076  24   0.063 353   0.341 285   0.023 279   0.006 261   0.014 236   0.011 166
CM                  -0.037    0.048 242   0.029 109   0.038 116   0.015 104   0.008  65   0.007  17   0.003 334   0.004 353   0.004 308

DCP 1      .010      0.472    3.247 347   0.965  50   0.340   4   0.357   1   0.110  67   0.027 303   0.053  59   0.081 131   0.027 163
DCP 2      .020      0.492    2.991 350   0.882  51   0.289  25   0.274   1   0.108  89   0.018 244   0.020 157   0.072 161   0.057 184
DCP 3      .030      0.537    2.686 349   0.916  52   0.269  38   0.218 353   0.085  85   0.072 212   0.059 178   0.053 162   0.072 193
DCP 4      .045      0.881    2.607 350   0.825  45   0.208  79   0.157 359   0.356 110   0.090 178   0.074 184   0.023 156   0.017 167
DCP 5      .095      0.958    1.581 348   0.908  53   0.277  74   0.059  36   0.044 278   0.027 247   0.064 183   0.098 255   0.038 330
DCP 6      .145      0.850    1.505 348   0.952  53   0.163  50   0.144 100   0.102 275   0.129 318   0.057  14   0.086 258   0.047 353
DCP 7      .200      0.755    1.135 355   0.781  57   0.112  32   0.186  61   0.155 276   0.194 342   0.092   3   0.073  26   0.052 156
DCP 8      .250      0.706    0.950   0   0.551  52   0.138   0   0.195  30   0.118 298   0.136 340   0.056 306   0.081 347   0.035 167
DCP 9      .300      0.641    0.838   6   0.369  47   0.169 359   0.137  12   0.125 325   0.058 337   0.075 305   0.041 311   0.039 245
DCP10      .395      0.528    0.739  11   0.213  38   0.134   3   0.074 342   0.065 335   0.023 222   0.022 293   0.021 201   0.020 288
DCP11      .501      0.425    0.630  15   0.178  22   0.078   2   0.082 315   0.044 300   0.035 230   0.018 230   0.031 210   0.015 182
DCP12      .600      0.367    0.527  15   0.153   5   0.055   4   0.084 308   0.042 264   0.043 229   0.022 193   0.033 206   0.029 160
DCP13      .701      0.377    0.365  25   0.128 344   0.010  44   0.069 302   0.035 233   0.037 204   0.021 149   0.024 196   0.030 136
DCP14      .800      0.215    0.295  22   0.117 213   0.009 249   0.058 282   0.044 213   0.032 186   0.023 127   0.015 146   0.023 108
DCP15      .900     -0.025    0.182  15   0.097 302   0.033 294   0.053 270   0.043 222   0.031 183   0.020 130   0.016 139   0.018  92
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                        FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        39.70       0.251       0.234       5.25        0.0         13.89       12087.1      20

              V          Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               81.0       16447.      0.37E 07   -0.108       1.339       19.15       0.00006    -0.038        0.0
              (264.2)    (343.5)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             13.887     5.246   0   0.306 359   0.036 144   0.087 263   0.052  45   0.014 353   0.029 136   0.024 204   0.017  70
CN                 1.045     0.377  17   0.080 146   0.036   2   0.009 267   0.014  59   0.005 304   0.009  68   0.008 197   0.006  72
CM                -0.023     0.017 162   0.039 281   0.020 142   0.009 280   0.007 163   0.004  84   0.004 208   0.002  91   0.002 291

DCP 1     .010     4.060     1.485  49   0.706 326   0.287 231   0.180 219   0.154  98   0.023 100   0.084 212   0.086 183   0.022 130
DCP 2     .020     3.800     1.340  38   0.507 310   0.190 212   0.060 257   0.081  60   0.017 343   0.046 146   0.084 187   0.051  54
DCP 3     .030     3.733     1.364  25   0.451 282   0.271 157   0.132 335   0.053 274   0.112 168   0.109  45   0.097 235   0.033 148
DCP 4     .049     3.106     0.963  38   0.262 320   0.155 178   0.066 312   0.076 146   0.032  79   0.016   9   0.045 232   0.011 165
DCP 5     .074     2.673     0.851  30   0.253 282   0.149 140   0.068 321   0.031 105   0.030  53   0.008 107   0.055 175   0.023  59
DCP 6     .099     2.502     0.789  25   0.257 255   0.141 125   0.114 308   0.038  29   0.018 334   0.018 121   0.052 138   0.077   2
DCP 7     .149     2.015     0.690  13   0.272 216   0.150  78   0.092 290   0.028 340   0.017 126   0.018 237   0.021  77   0.013 248
DCP 8     .200     1.768     0.632   2   0.298 198   0.132  74   0.082 269   0.051 254   0.018 156   0.016  51   0.0[illegible] 276   0.022  81
DCP 9     .250     1.392     0.609   7   0.233 163   0.098  40   0.035 294   0.083 163   0.051  94   0.021   5   0.029 212   0.013  74
DCP10     .300     1.187     0.499   6   0.206 148   0.097  17   0.045 240   0.081 124   0.032  13   0.021 202   0.022 131   0.029  25
DCP11     .399     0.983     0.415  13   0.203 141   0.100   8   0.036 210   0.060 111   0.031   4   0.033 184   0.023  61   0.011  14
DCP12     .501     0.767     0.325  16   0.188 125   0.099 340   0.031 184   0.050  66   0.035 300   0.022 104   0.014 338   0.021 284
DCP13     .600     0.665     0.257  19   0.170 115   0.086 333   0.039 116   0.046  31   0.038 287   0.041  77   0.009 351   0.010 188
DCP14     .701     0.511     0.172  21   0.143  96   0.093 303   0.032 112   0.048 345   0.027 226   0.034  38   0.017 260   0.021 150
DCP15     .800     0.323     0.092   6   0.133  85   0.081 305   0.039  85   0.053 319   0.017 229   0.032   7   0.019 275   0.016 101
DCP16     .900     0.088     0.055 335   0.086  71   0.038 274   0.042  53   0.028 298   0.015 173   0.011 262   0.023 192   0.016  94
DCP17     .969     0.020     0.040 337   0.042  54   0.029  25   0.024  75   0.024 303   0.007   8   0.023 322   0.016 192   0.014  21
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                        FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        39.11       0.293       0.198       5.38        0.0         15.01       12087.2      20

              V          Q           RN          CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
               68.0       11893.      0.32E 07   -0.272       1.935       19.48       0.00215    -1.231        0.0
              (223.0)    (248.4)
                                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             15.005     5.384   0   0.276 352   0.023 243   0.072 293   0.047  29   0.017  79   0.025 192   0.003 266   0.001 181
CN                 1.261     0.656  14   0.161 185   0.090  36   0.027 266   0.007 258   0.026 274   0.016 129   0.015 351   0.016 166
CM                -0.052     0.069 129   0.072 317   0.038 167   0.014  17   0.005 218   0.010 109   0.005 297   0.006 177   0.026 346

DCP 1     .010     4.273     2.369  67   0.727   4   0.320   5   0.428 269   0.216 225   0.141 168   0.062 135   0.089  38   0.067 320
DCP 2     .020     4.186     2.119  52   0.572 342   0.178  23   0.252 271   0.170 191   0.138 121   0.067   7   0.040 291   0.006 212
DCP 3     .030     4.133     2.152  45   0.778 317   0.190 162   0.088 138   0.127  25   0.137 246   0.071 162   0.054  88   0.078   6
DCP 4     .049     3.409     1.734  44   0.583 324   0.149 180   0.035 301   0.092 176   0.027  35   0.036 240   0.038 284   0.044 131
DCP 5     .074     2.963     1.594  37   0.527 296   0.187 153   0.007 272   0.055 111   0.053 319   0.010 128   0.046 271   0.050 139
DCP 6     .099     2.811     1.469  33   0.453 279   0.158 138   0.033 148   0.071  63   0.073 298   0.044 184   0.024 256   0.039 135
DCP 7     .149     2.232     1.288  24   0.368 250   0.144 132   0.084  91   0.087   2   0.067 263   0.037 158   0.017 164   0.043  50
DCP 8     .200     1.953     1.183  19   0.375 243   0.168 143   0.098  71   0.086 341   0.088 260   0.056 159   0.008 186   0.009 325
DCP 9     .250     1.762     1.046   8   0.374 211   0.198 131   0.152   9   0.103 283   0.079 208   0.050 101   0.030   3   0.034 298
DCP10     .330     1.565     0.928   2   0.405 192   0.232  71   0.154 335   0.115 242   0.081 154   0.046  38   0.024 347   0.016 216
DCP11     .399     1.302     0.771   2   0.384 181   0.217  58   0.134 321   0.125 227   0.068 100   0.036 334   0.005 269   0.036 194
DCP12     .501     1.017     0.610 358   0.348 166   0.213  33   0.122 277   0.075 174   0.062  18   0.021 262   0.016 257   0.033 156
DCP13     .600     0.887     0.479 354   0.345 152   0.215  15   0.127 243   0.084 113   0.100 326   0.030 188   0.027  87   0.015 260
DCP14     .701     0.669     0.344 345   0.306 132   0.203 340   0.115 191   0.059  49   0.076 287   0.043 149   0.048  35   0.044 205
DCP15     .800     0.441     0.245 323   0.262 119   0.176 323   0.107 153   0.056   8   0.070 252   0.036 116   0.042 337   0.042 151
DCP16     .900     0.127     0.160 314   0.142 105   0.113 307   0.059 149   0.041 356   0.039 268   0.029 103   0.033 345   0.043 110
DCP17     .969     0.051     0.072 321   0.029 107   0.041 307   0.026 161   0.045   5   0.034 234   0.031  66   0.033 310   0.005 217
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                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0       39.15       0.297       0.197       5.39        0.0         16.08      12087.1      20

           V          Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             67.2      11707.      0.32E 07   -0.310       1.875       20.75       0.00253    -1.437       0.0
           (220.5)    (244.5)
                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             16.079    5.389   0   0.298 351   0.026 236   0.073 299   0.045  48   0.013  52   0.028 197   0.007 257   0.024 178
CN                 1.275    0.651  18   0.120 191   0.072  29   0.035 278   0.029 167   0.037 316   0.015 141   0.032 319   0.021 105
CM                -0.058    0.080   7   0.077 316   0.041 174   0.014  44   0.009 272   0.017 103   0.010 293   0.013 140   0.008 246

DCP 1    .010      4.19     2.030  77   0.751  20   0.451  30   0.434 305   0.330 271   0.136 258   0.089 239   0.105  88   0.095 152
DCP 2    .020      4.105    2.080  66   0.563 356   0.263  56   0.264 321   0.246 269   0.164 203   0.122 153   0.077  61   0.050  99
DCP 3    .030      4.046    2.218  56   0.825 334   0.175 252   0.215 193   0.126  93   0.084 340   0.114 285   0.105 213   0.092 122
DCP 4    .049      3.356    1.953  57   0.779 330   0.210 229   0.114 174   0.049 184   0.055  70   0.036 233   0.056  34   0.012 316
DCP 5    .074      2.977    1.737  48   0.655 311   0.198 207   0.102 157   0.027 153   0.075  19   0.047 251   0.054 351   0.040 246
DCP 6    .099      2.800    1.555  43   0.556 300   0.186 199   0.080 154   0.053 133   0.128  18   0.063 274   0.050 302   0.043 219
DCP 7    .149      2.251    1.367  31   0.465 281   0.196 187   0.066 106   0.086 128   0.136 351   0.055 241   0.047 281   0.049 140
DCP 8    .200      1.978    1.277  27   0.450 269   0.228 178   0.084  97   0.068  91   0.105 349   0.060 225   0.042 198   0.075 144
DCP 9    .250      1.785    1.085   9   0.412 215   0.221 102   0.155  15   0.097 306   0.096 226   0.084 102   0.023  11   0.057 273
DCP10    .300      1.600    0.963   1   0.417 198   0.243  84   0.212 335   0.124 238   0.097 143   0.085  49   0.081 309   0.046 172
DCP11    .399      1.315    0.792   2   0.358 187   0.223  68   0.191 337   0.156 214   0.094  89   0.035 350   0.022 247   0.046  75
DCP12    .501      1.038    0.606 356   0.339 168   0.213  41   0.113 292   0.133 184   0.076  13   0.047 271   0.030 186   0.048  80
DCP13    .600      0.897    0.448 352   0.336 151   0.228   9   0.130 251   0.114 125   0.121 317   0.029 197   0.042  55   0.015  31
DCP14    .701      0.694    0.357 345   0.329 130   0.226 343   0.153 204   0.073  58   0.104 276   0.094 138   0.097 355   0.032 137
DCP15    .800      0.472    0.281 320   0.310 120   0.211 330   0.092 159   0.051  47   0.075 255   0.063 140   0.077 328   0.035  32
DCP16    .900      0.157    0.162 311   0.192  91   0.120 306   0.051 177   0.049  11   0.092 293   0.059  90   0.075 295   0.055  36
DCP17    .969      0.042    0.033 318   0.011 330   0.090 344   0.020 254   0.067  82   0.071 256   0.050  46   0.076 278   0.058 134

                    FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1

           TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
             0.0       39.72       0.278       0.210       6.17        0.0         13.19      12169.1      20

           V          Q           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
             72.7      13818.      0.35E 07   -0.256       2.436       19.38       0.00113    -0.692       0.0
           (238.6)    (288.6)
                                                   HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             13.190    6.169   0   0.603   2   0.116 300   0.058 354   0.018 107   0.015 192   0.028 271   0.027 320   0.022 224
CN                 1.396    0.697  31   0.254 267   0.099 172   0.029  10   0.044 348   0.048  16   0.016 294   0.016 128   0.021 131
CM                -0.039    0.073 153   0.074   0   0.043 262   0.020 139   0.013  25   0.010 316   0.002  69   0.002 228   0.007 121

DCP 1    .010      4.124    2.294  77   1.376   2   0.404 313   0.383 271   0.202 171   0.090  73   0.038 285   0.135 268   0.115 182
DCP 2    .020      3.861    2.130  67   1.249 357   0.303 312   0.296 280   0.146 156   0.108 105   0.061   9   0.117 323   0.063 266
DCP 3    .030      3.764    2.100  65   1.361 346   0.307 275   0.239 275   0.193 172   0.077 121   0.084  81   0.161 345   0.119 317
DCP 4    .049      3.836    1.837  49   1.146 336   0.361 237   0.096  98   0.084  89   0.040   9   0.059 295   0.099 282   0.037 141
DCP 5    .074      4.782    1.594  82   0.968 235   1.388 224   1.197 260   1.376 326   1.350  16   0.660  71   0.516  69   0.818 127
DCP 6    .099      3.532    1.573  41   0.874 314   0.219 240   0.159 115   0.142  84   0.079 334   0.105 273   0.091 263   0.033 238
DCP 7    .149      2.970    1.445  37   0.785 296   0.181 222   0.246  96   0.157  65   0.106 322   0.155 275   0.065 234   0.043 206
DCP 8    .200      2.631    1.347  39   0.697 292   0.234 230   0.243  94   0.179  87   0.061 308   0.113 280   0.041 243   0.049 165
DCP 9    .250      1.680    1.036  22   0.448 286   0.224 197   0.221 127   0.133  45   0.131   9   0.111 308   0.096 217   0.077 162
DCP10    .300      1.455    0.903  19   0.385 273   0.234 179   0.197  96   0.126  21   0.120 341   0.119 252   0.115 158   0.071  80
DCP11    .399      1.231    0.823  22   0.381 260   0.249 172   0.228  83   0.164   2   0.101 287   0.086 225   0.122 133   0.077  74
DCP12    .501      1.017    0.652  16   0.336 237   0.237 135   0.207  35   0.131 311   0.104 215   0.058 135   0.068  63   0.065 341
DCP13    .600      0.892    0.520  10   0.318 210   0.208 101   0.180 347   0.111 268   0.113 156   0.050  73   0.047  11   0.064 291
DCP14    .701      0.726    0.380   1   0.326 184   0.202  70   0.164 303   0.101 210   0.119  98   0.041  17   0.045 290   0.036 240
DCP15    .800      0.453    0.265 353   0.230 178   0.111  62   0.143 291   0.075 193   0.110  78   0.063 344   0.014 233   0.018  74
DCP16    .900      0.127    0.145   0   0.147 158   0.078  65   0.102 266   0.045 156   0.031  39   0.013 249   0.015 190   0.013 164
DCP17    .969      0.121    0.150 322   0.178 161   0.113  45   0.147 233   0.084 133   0.085 320   0.075 201   0.061  35   0.055 245
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         39.70       0.280      0.209       8.10        0.0         14.84       12169.2      20

                  V           Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                    72.1       13478.      0.34E 07  -0.345       2.378       23.16       0.00100    -0.609        0.0
                  (236.6)     (281.5)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              14.840    8.101   0   0.747 354   0.127 288   0.060 358   0.027  88   0.012 109   0.010 207   0.019 217   0.021 146
CN                  1.246    0.905  29   0.204 266   0.112 157   0.020 356   0.010  20   0.046  35   0.018  52   0.009  95   0.025  95
CM                 -0.070    0.112 162   0.094   7   0.052 255   0.016 163   0.011   3   0.006  23   0.003 274   0.005  65   0.004 234

DCP 1      .010     3.817    2.297  77   1.483  22   0.286  13   0.434 297   0.138 213   0.066 190   0.046 115   0.076 275   0.019 261
DCP 2      .020     3.413    2.280  69   1.348  18   0.266 347   0.328 301   0.098 206   0.068 168   0.101 136   0.075  82   0.133  31
DCP 3      .030     3.295    2.126  66   1.309  15   0.338 332   0.383 293   0.190 215   0.131 174   0.172 134   0.127  74   0.125  45
DCP 4      .049     3.184    1.996  48   1.084   0   0.424 266   0.163 199   0.126 125   0.155  70   0.079   1   0.028 321   0.035 326
DCP 5      .074     3.454    1.925  78   0.404 272   1.126 290   1.072 254   0.918 326   1.013  26   0.591  59   0.435  77   0.576 127
DCP 6      .099     2.665    1.738  40   0.728 334   0.299 241   0.177 182   0.188 111   0.152  52   0.082   3   0.078 315   0.081 245
DCP 7      .149     2.143    1.633  35   0.659 311   0.303 222   0.216 153   0.189  87   0.139  38   0.087 329   0.056 281   0.071 216
DCP 8      .200     1.878    1.568  34   0.629 307   0.334 215   0.197 140   0.169 100   0.138  41   0.080 328   0.058 299   0.029 234
DCP 9      .250     1.689    1.411  28   0.550 289   0.327 188   0.187 104   0.109  61   0.113   6   0.102 264   0.069 178   0.070 112
DCP10      .300     1.493    1.250  27   0.478 279   0.335 178   0.204  85   0.113  29   0.093 316   0.085 221   0.079 134   0.064  54
DCP11      .399     1.271    1.130  25   0.436 263   0.335 166   0.240  73   0.124 359   0.082 271   0.064 196   0.065 113   0.052  39
DCP12      .501     1.073    0.962  17   0.425 234   0.324 130   0.228  34   0.135 292   0.073 192   0.047 126   0.050  51   0.028  12
DCP13      .600     0.937    0.780   9   0.425 207   0.295 101   0.189 356   0.124 242   0.101 143   0.065  64   0.040 333   0.011  96
DCP14      .701     0.746    0.559   4   0.380 183   0.262  73   0.165 318   0.114 194   0.074  82   0.038  14   0.043 241   0.018  61
DCP15      .800     0.450    0.383   2   0.285 175   0.179  63   0.126 298   0.119 179   0.086  52   0.033 284   0.028 152   0.040 345
DCP16      .900     0.175    0.285 338   0.220 155   0.148  11   0.099 217   0.057  96   0.029 273   0.051  60   0.049 227   0.038  91
DCP17      .969     0.151    0.279 322   0.231 156   0.204  18   0.174 219   0.119  78   0.110 280   0.062 108   0.065 317   0.082 152

                              FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

                  TUNED HZ    DRIVE HZ    K          MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
                   0.0         39.70       0.286      0.205       8.19        0.0         16.06       12169.3      20

                  V           Q           RN         CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                    70.7       13033.      0.34E 07  -0.383       2.501       24.50       0.00128    -0.765        0.0
                  (231.9)     (272.2)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              16.063    8.188   0   0.783 356   0.147 271   0.077  35   0.041 103   0.027 107   0.017 222   0.015 223   0.026 174
CN                  1.317    0.912  33   0.205 287   0.120 178   0.014  83   0.021  16   0.036  38   0.029  86   0.009 328   0.024 136
CM                 -0.081    0.141 163   0.099  17   0.056 272   0.020 204   0.002 324   0.015  57   0.007 321   0.006 136   0.006  31

DCP 1      .010     3.911    2.525  92   1.426  31   0.459  34   0.435 310   0.176 306   0.152 222   0.044 178   0.025  90   0.123 359
DCP 2      .020     3.487    2.383  82   1.327  28   0.405  19   0.324 317   0.120 315   0.133 218   0.097 199   0.126 156   0.116  94
DCP 3      .030     3.408    2.146  78   1.330  27   0.395   3   0.401 316   0.150 276   0.129 235   0.152 199   0.133 178   0.161 130
DCP 4      .049     3.294    1.847  60   1.179  16   0.409 299   0.229 272   0.197 192   0.188 127   0.084  92   0.058  40   0.073   1
DCP 5      .074     3.799    2.054  97   0.363 288   0.977 237   1.370 254   1.211 316   1.235  34   0.754  87   0.358  78   0.625 105
DCP 6      .099     2.772    1.693  49   0.820 352   0.347 271   0.220 223   0.226 150   0.137  95   0.073  91   0.091  30   0.090 331
DCP 7      .149     2.224    1.628  43   0.704 332   0.350 256   0.223 185   0.175 130   0.139  88   0.101  40   0.070 333   0.052 293
DCP 8      .200     1.929    1.553  43   0.698 331   0.421 244   0.189 180   0.203 138   0.176  85   0.096  22   0.079 324   0.053 315
DCP 9      .250     1.727    1.469  35   0.640 310   0.444 217   0.272 138   0.218 102   0.168  44   0.122 347   0.113 298   0.106 219
DCP10      .300     1.566    1.297  31   0.545 300   0.404 206   0.281 120   0.195  71   0.150   5   0.101 299   0.096 247   0.099 165
DCP11      .399     1.356    1.202  29   0.500 285   0.433 191   0.310 103   0.181  46   0.138 329   0.085 269   0.094 204   0.079 145
DCP12      .501     1.155    1.049  19   0.452 252   0.405 157   0.302  64   0.164 343   0.118 257   0.076 194   0.073 134   0.048  69
DCP13      .600     0.898    0.874  10   0.444 219   0.369 122   0.260  30   0.173 300   0.127 207   0.069 132   0.056  68   0.026  10
DCP14      .701     0.792    0.647   3   0.421 196   0.313  95   0.222 351   0.153 241   0.099 147   0.039  71   0.031 339   0.011 313
DCP15      .800     0.498    0.433 354   0.305 180   0.216  77   0.132 330   0.134 218   0.097 113   0.058  17   0.048 236   0.035  68
DCP16      .900     0.232    0.373 334   0.280 159   0.235  45   0.159 230   0.108  86   0.076 271   0.098 104   0.100 317   0.089 197
DCP17      .969     0.180    0.308 321   0.256 162   0.259  23   0.213 241   0.183  97   0.157 304   0.127 166   0.103  31   0.080 242
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        39.67       0.287       0.204      10.66        0.0        13.97       12173.1      20

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
               70.5        12727.     0.33E 07   -0.397       2.417       24.85       0.00068    -0.401        0.0
             (231.2)     (265.8)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             13.972  10.662   0   1.207 354   0.230 319   0.072   0   0.067 152   0.055 137   0.023 114   0.020 272   0.010 194
CN                 1.179   1.059  26   0.174 282   0.098 139   0.042  50   0.037  82   0.008  92   0.018 109   0.028 314   0.021 141
CM                -0.098   0.122 165   0.116   4   0.055 252   0.017 153   0.036 319   0.039  12   0.011 270   0.016 123   0.012 335

DCP 1    .010      3.211   2.274  60   1.842  27   0.376   6   0.422 303   0.130 245   0.037 170   0.089 133   0.030  38   0.044 270
DCP 2    .020      2.975   2.429  54   1.628  23   0.372 352   0.429 300   0.143 242   0.120 184   0.172 134   0.162  77   0.131  23
DCP 3    .030      2.906   2.211  53   1.458  21   0.391 345   0.427 297   0.167 233   0.103 193   0.163 150   0.145  90   0.114  52
DCP 4    .049      2.675   2.143  46   1.217  10   0.281 305   0.259 274   0.137 179   0.092 117   0.070 111   0.060  65   0.063  28
DCP 5    .074      2.407   2.027  42   1.019 356   0.276 277   0.206 239   0.155 146   0.115 101   0.091  72   0.073  32   0.079 336
DCP 6    .099      2.375   1.940  39   0.875 347   0.270 264   0.213 219   0.171 129   0.135  88   0.097  51   0.078   5   0.077 296
DCP 7    .149      1.937   1.812  36   0.764 330   0.339 242   0.260 180   0.231 102   0.162  53   0.113 344   0.069 296   0.052 245
DCP 8    .200      1.740   1.727  36   0.704 326   0.380 232   0.282 166   0.226 101   0.196  46   0.124 328   0.082 281   0.067 229
DCP 9    .250      1.585   1.631  29   0.650 300   0.422 202   0.351 118   0.274  60   0.216 354   0.174 272   0.115 224   0.114 144
DCP10    .300      1.416   1.486  25   0.566 287   0.430 186   0.353  99   0.263  36   0.212 321   0.147 233   0.094 176   0.092 102
DCP11    .399      1.271   1.347  25   0.512 266   0.465 166   0.396  76   0.237 359   0.174 266   0.136 179   0.065  95   0.056  77
DCP12    .501      1.069   1.124  18   0.470 234   0.429 131   0.371  35   0.196 300   0.165 200   0.125 118   0.099  17   0.028 313
DCP13    .600      0.977   0.906  11   0.473 204   0.388  99   0.298 358   0.173 242   0.156 146   0.130  62   0.086 324   0.033 229
DCP14    .701      0.792   0.658   4   0.453 181   0.319  67   0.222 318   0.173 192   0.138 101   0.057 354   0.056 263   0.030 122
DCP15    .800      0.499   0.420   1   0.322 166   0.208  50   0.160 294   0.162 170   0.130  69   0.056 293   0.034 194   0.026  21
DCP16    .900      0.273   0.351 333   0.327 145   0.225   2   0.184 210   0.137  69   0.082 244   0.102  72   0.121 288   0.122 144
DCP17    .969      0.227   0.349 317   0.326 152   0.323   2   0.275 212   0.234  73   0.181 270   0.166 119   0.165 331   0.139 187
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                     FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1

             TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
               0.0        39.69       0.294       0.200      10.63        0.0        14.97       12173.2      20

             V           Q           RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
               68.8        12281.     0.33E 07   -0.380       2.562       25.84       0.00076    -0.441        0.0
             (225.7)     (256.5)
                                                         HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0   RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             14.973  10.633   0   1.202 355   0.257 318   0.046  21   0.066 157   0.047 140   0.025 105   0.008 285   0.011 132
CN                 1.242   1.079  29   0.183 303   0.079 171   0.036  99   0.041  73   0.013   1   0.027 136   0.017 351   0.038 213
CM                -0.100   0.137 166   0.113   8   0.049 262   0.011 176   0.010 206   0.012  75   0.015 304   0.010 143   0.009  23

DCP 1    .010      3.386   2.206  72   1.825  13   0.503  31   0.464 322   0.141 279   0.113 291   0.105 181   0.061 184   0.056  92
DCP 2    .020      3.092   2.338  65   1.649  31   0.472  14   0.442 318   0.150 281   0.128 241   0.143 185   0.134 155   0.173  96
DCP 3    .030      3.045   2.137  62   1.512  29   0.469   7   0.472 318   0.225 265   0.139 237   0.171 192   0.136 156   0.167 113
DCP 4    .049      2.819   2.068  53   1.319  19   0.352 327   0.309 293   0.211 215   0.130 148   0.068 116   0.208 130   0.074  49
DCP 5    .074      2.568   1.993  48   1.092   5   0.321 299   0.253 255   0.194 186   0.156 125   0.095  66   0.088  64   0.090  11
DCP 6    .099      2.519   1.946  45   0.938 355   0.313 285   0.238 231   0.202 162   0.163 111   0.117  82   0.112  43   0.103 343
DCP 7    .149      2.049   1.886  39   0.833 338   0.384 256   0.296 194   0.221 137   0.196  84   0.128  36   0.136 352   0.095 267
DCP 8    .200      1.841   1.790  40   0.809 333   0.462 252   0.320 184   0.251 136   0.287  79   0.129  16   0.106 334   0.064 276
DCP 9    .250      1.661   1.697  32   0.715 315   0.483 222   0.352 146   0.300  91   0.282  26   0.149 312   0.093 272   0.081 203
DCP10    .300      1.520   1.530  29   0.601 300   0.452 205   0.352 124   0.289  60   0.231 346   0.140 261   0.079 216   0.067 167
DCP11    .399      1.375   1.429  26   0.542 280   0.501 189   0.411 102   0.312  29   0.212 308   0.158 218   0.077 152   0.055  97
DCP12    .501      1.138   1.201  19   0.460 246   0.444 149   0.370  56   0.226 330   0.150 230   0.125 161   0.076  88   0.056   4
DCP13    .600      1.012   0.949  14   0.435 210   0.385 114   0.293  14   0.179 276   0.133 177   0.080 111   0.050  23   0.050 281
DCP14    .701      0.795   0.674   8   0.421 184   0.280  82   0.228 341   0.166 225   0.108 110   0.047  47   0.030 340   0.042 265
DCP15    .800      0.497   0.427   2   0.307 169   0.197  63   0.149 317   0.126 190   0.083  77   0.023 344   0.019 214   0.039 221
DCP16    .900      0.298   0.433 328   0.374 148   0.309   8   0.227 216   0.167  54   0.127 247   0.128  87   0.133 289   0.095 152
DCP17    .969      0.241   0.400 318   0.346 153   0.348   8   0.367 228   0.243  81   0.195 292   0.197 143   0.144 358   0.111 216
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1

                TUNED HZ    DRIVE HZ     K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O      TEST POINT  CYCLES ANALYSED
                 0.0         39.68        0.298       0.197      10.67        0.0         15.94       12173.3      20

                V           Q            RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP    TDR         EXT DAMP
                 67.8        11994.       0.32E 07   -0.404       2.680       26.81       0.00080    -0.459        0.0
                (222.6)     (250.5)
                                                           HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             15.936   10.666   0   1.216 356    0.270 321    0.046  27    0.075 168    0.051 140    0.027  99    0.019 314    0.014 191
CN                 1.294    1.096  31   0.195 318    0.079 190    0.036 138    0.043  96    0.018 335    0.023 140    0.025   6    0.018 186
CM                -0.106    0.152 168   0.112  15    0.047 280    0.006 250    0.015 222    0.020 100    0.017 314    0.016 168    0.010  25

DCP 1     .010     3.521    2.221  63   1.033  40    0.653  42    0.506 332    0.166 312    0.149 271    0.124 236    0.107 186    0.054 158
DCP 2     .020     3.183    2.277  74   1.644  39    0.604  31    0.484 333    0.191 303    0.128 257    0.118 235    0.177 180    0.159 141
DCP 3     .030     3.129    2.071  71   1.521  36    0.536  27    0.516 336    0.234 295    0.170 271    0.188 232    0.183 193    0.181 155
DCP 4     .049     2.917    2.070  60   1.342  24    0.379 349    0.375 310    0.233 245    0.149 192    0.120 174    0.135 125    0.098  92
DCP 5     .074     2.649    2.005  55   1.134  13    0.348 326    0.312 283    0.225 213    0.175 163    0.121 141    0.155  98    0.106  56
DCP 6     .099     2.578    1.927  51   0.994   5    0.357 307    0.282 261    0.235 197    0.190 145    0.118 119    0.166  84    0.115  39
DCP 7     .149     2.129    1.884  43   0.871 349    0.428 283    0.306 225    0.284 172    0.226 115    0.135  74    0.148  48    0.122 338
DCP 8     .200     1.922    1.827  43   0.843 345    0.481 269    0.310 212    0.317 168    0.256 105    0.144  59    0.157  17    0.096 313
DCP 9     .250     1.730    1.711  36   0.746 324    0.518 234    0.349 167    0.333 120    0.290  51    0.206   0    0.216 304    0.148 230
DCP10     .300     1.591    1.578  31   0.642 311    0.511 220    0.368 147    0.353  87    0.261  11    0.177 313    0.159 258    0.123 190
DCP11     .399     1.448    1.500  28   0.580 293    0.561 203    0.452 122    0.328  52    0.242 337    0.159 267    0.095 205    0.094 160
DCP12     .501     1.206    1.266  20   0.482 257    0.477 165    0.381  77    0.265 354    0.164 271    0.138 202    0.081 125    0.068  57
DCP13     .600     1.034    0.991  14   0.418 219    0.382 129    0.306  37    0.204 299    0.130 207    0.098 150    0.092  64    0.045 343
DCP14     .701     0.826    0.712   9   0.416 190    0.312  96    0.216 355    0.156 245    0.087 151    0.063  82    0.047 339    0.006 299
DCP15     .800     0.523    0.467   2   0.323 174    0.221  72    0.140 315    0.117 210    0.071  98    0.027  39    0.012 254    0.015 100
DCP16     .900     0.325    0.472 331   0.382 154    0.311  18    0.251 226    0.195  73    0.177 267    0.164 111    0.162 333    0.105 188
DCP17     .969     0.249    0.380 322   0.335 159    0.333  13    0.300 232    0.235  93    0.224 303    0.196 148    0.187  12    0.142 231
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TABLE A. ACCELERATION TARES

Transducer P1

Average Orifice
Location, X/C = 0.010

Units: psi
Δα = 5° (nominal)

F_D (Hz)	Steady					
24.2	-0,006	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,014	-0,014	0,001	174,800
		2.	0,027	-0,021	-0,017	218,300
		3.	0,042	0,042	0,001	1,312
		4.	0,020	0,016	0,012	35,800
		5.	0,015	0,014	-0,006	336,200
		6.	0,017	0,016	0,005	15,890
		7.	0,012	0,012	0,003	15,670
		8.	0,023	0,002	-0,023	274,700
		9.	0,004	0,004	0,000	6,444
48.0	0,027	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,140	-0,073	0,120	121,200
		2.	0,069	0,057	-0,038	326,800
		3.	0,018	0,018	0,002	4,738
		4.	0,079	0,064	0,047	36,200
		5.	0,010	0,009	0,003	15,320
		6.	0,018	0,014	0,011	37,460
		7.	0,013	0,011	0,007	32,480
		8.	0,011	0,010	-0,005	335,000
		9.	0,009	-0,004	0,008	116,000
56.2	-0,005	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,077	0,077	0,008	6,237
		2.	0,026	-0,026	-0,001	182,500
		3.	0,071	-0,069	-0,019	195,500
		4.	0,026	0,023	0,012	26,900
		5.	0,023	0,023	0,001	1,818
		6.	0,033	-0,008	0,032	103,800
		7.	0,006	-0,004	0,005	127,000
		8.	0,005	0,005	-0,000	356,500
		9.	0,011	-0,008	-0,008	222,400
71.8	0,003	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,038	-0,036	-0,012	198,600
		2.	0,019	0,004	0,018	77,590
		3.	0,029	-0,012	0,027	113,700
		4.	0,009	0,008	0,005	32,060
		5.	0,014	0,012	-0,006	332,200
		6.	0,012	0,002	0,012	79,600
		7.	0,006	-0,003	-0,005	242,800
		8.	0,008	0,006	0,005	36,420
		9.	0,006	0,005	-0,002	341,200

TABLE B. ACCELERATION TARES

Transducer P2 | **Acceleration Tares**

Average Orifice
Location, X/C = 0.020

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady					
24.2	0,006	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,015	-0,015	-0,002	186,400
		2,	0,017	-0,011	-0,013	229,700
		3,	0,033	0,033	0,002	2,787
		4,	0,017	0,014	0,010	34,970
		5,	0,019	0,019	-0,001	356,700
		6,	0,017	0,013	0,011	39,320
		7,	0,005	0,003	0,004	51,700
		8,	0,033	0,013	-0,030	294,300
		9,	0,008	0,008	0,002	16,940
48.0	0,033	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,140	-0,092	0,105	131,200
		2,	0,059	0,047	-0,036	323,100
		3,	0,016	0,015	0,007	24,330
		4,	0,082	0,058	0,059	45,590
		5,	0,027	0,025	0,007	16,130
		6,	0,017	-0,001	0,017	92,980
		7,	0,024	0,020	-0,012	328,100
		8,	0,015	0,015	0,003	11,570
		9,	0,019	0,012	-0,015	310,400
56.2	-0,003	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,100	0,100	0,003	1,497
		2,	0,037	-0,033	-0,018	208,400
		3,	0,080	-0,059	-0,054	222,200
		4,	0,025	0,022	0,012	27,360
		5,	0,018	0,012	0,013	47,370
		6,	0,039	-0,015	0,036	112,700
		7,	0,012	-0,002	0,012	101,000
		8,	0,015	0,015	-0,003	349,400
		9,	0,006	-0,002	-0,006	253,300
71.8	0,015	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,023	-0,020	-0,009	204,600
		2,	0,026	-0,025	0,004	170,900
		3,	0,038	-0,023	0,030	128,000
		4,	0,015	0,015	0,000	1,536
		5,	0,010	-0,009	-0,006	215,100
		6,	0,019	0,005	0,019	75,450
		7,	0,014	0,006	-0,013	294,900
		8,	0,005	-0,005	0,001	167,300
		9,	0,019	-0,007	0,018	111,100

TABLE C. ACCELERATION TARES

Transducer P03 Acceleration Tares

Average Orifice
Location, X/C = 0.030

Units: psi
$\Delta\alpha = 5^\circ$

F_D(Hz)	Steady					
24.2	-0,004	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,001	-0.000	0.001	103,800
		2,	0,012	-0.009	-0.008	222,100
		3,	0,018	0.018	0.004	14,270
		4,	0,011	0.007	0.008	51,150
		5,	0,006	0.006	-0.000	357,400
		6,	0,007	-0.005	0.005	131,600
		7,	0,005	0.000	0.005	89,190
		8,	0,019	0.007	-0.017	293,700
		9,	0,004	0.004	-0,001	347,200
48.0	0,016	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,082	-0,049	0,065	127,000
		2,	0,041	0.037	-0,018	333,700
		3,	0,013	0.013	0.001	4,407
		4,	0,049	0.037	0.033	41,760
		5,	0,006	0.006	0.000	4,220
		6,	0,005	0.005	-0.000	359,900
		7,	0,006	0.005	-0.004	322,300
		8,	0,020	0.020	-0.003	352,500
		9,	0,009	-0,009	0.000	177,800
56.2	-0,007	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,055	0.055	0.007	6.933
		2,	0,022	-0.022	0.002	175,700
		3,	0,051	-0.043	-0.027	212,500
		4,	0,015	0,012	0.010	38,100
		5,	0,013	0.013	0.002	10,800
		6,	0,019	-0.013	0.014	132,800
		7,	0,008	-0,008	0.004	154,800
		8,	0,002	-0,002	-0,002	229,200
		9,	0,009	-0.006	-0.006	224,700
71.8	0,015	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,028	-0.026	-0,010	201,900
		2,	0,016	-0.013	0,010	141,300
		3,	0,019	-0.007	0.018	111,000
		4,	0,009	0.007	-0.007	314,900
		5,	0,006	-0.001	-0.006	255,900
		6,	0,020	-0.018	0.007	158,600
		7,	0.007	-0.004	-0.005	230,100
		8,	0,002	-0.001	0.002	108,300
		9,	0,003	0.003	-0,002	322,600

TABLE D. ACCELERATION TARES

Transducer P04 Acceleration Tares

Average Orifice
Location, X/C = 0.049

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D (Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	-0,015	1,	0,014	-0,011	0,009	139,200
		2,	0,014	-0,013	-0,006	206,800
		3,	0,035	0,027	0,022	39,270
		4,	0,021	0,019	0,010	27,230
		5,	0,007	-0,006	-0,002	201,300
		6,	0,007	-0,007	0,001	169,300
		7,	0,012	0,002	0,012	82,090
		8,	0,032	0,004	-0,031	277,400
		9,	0,028	0,022	0,018	39,270
48.0	0,026	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,068	-0,057	0,037	147,400
		2,	0,065	0,017	-0,063	285,500
		3,	0,039	0,014	-0,037	290,900
		4,	0,061	0,045	0,042	43,490
		5,	0,023	0,021	0,011	27,500
		6,	0,027	0,020	0,019	44,010
		7,	0,005	0,005	-0,001	352,700
		8,	0,023	0,019	0,014	36,260
		9,	0,006	-0,003	0,006	115,300
56.2	-0,022	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,040	0,038	-0,013	341,200
		2,	0,034	-0,028	0,019	146,100
		3,	0,049	-0,036	-0,033	222,700
		4,	0,031	0,021	0,022	46,460
		5,	0,021	0,017	-0,012	323,900
		6,	0,012	-0,009	0,008	139,600
		7,	0,017	0,008	-0,015	297,900
		8,	0,045	0,042	-0,015	340,200
		9,	0,036	-0,027	-0,023	220,300
71.8	0,003	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,028	-0,028	-0,000	180,300
		2,	0,025	-0,024	-0,004	190,400
		3,	0,044	-0,030	0,032	133,900
		4,	0,018	-0,000	-0,018	269,900
		5,	0,031	0,011	-0,029	291,400
		6,	0,015	0,007	0,014	63,960
		7,	0,029	0,029	-0,004	352,900
		8,	0,016	-0,011	0,011	133,200
		9,	0,015	-0,012	0,009	141,900

TABLE E. ACCELERATION TARES

Transducer P05 — **Acceleration Tares**

Average Orifice
Location, X/C = 0.074

Units: psi
$\Delta\alpha = 5^\circ$

F_D (Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	0,001	1.	0,014	-0,014	0,000	179,500
		2.	0,018	-0,011	-0,014	231,900
		3.	0,025	0,025	0,006	13,700
		4.	0,014	0,011	0,009	39,390
		5.	0,006	0,006	-0,001	348,900
		6.	0,005	0,005	0,000	0,537
		7.	0,002	-0,000	0,002	96,190
		8.	0,019	0,003	-0,018	280,600
		9.	0,006	0,002	0,005	69,520
48.0	0,022	1.	0,083	-0,052	0,065	128,700
		2.	0,032	0,026	-0,018	325,600
		3.	0,024	0,023	-0,007	343,400
		4.	0,056	0,037	0,042	48,350
		5.	0,010	0,010	0,003	17,740
		6.	0,015	0,015	0,003	10,420
		7.	0,007	0,006	0,002	21,120
		8.	0,012	0,012	-0,001	356,600
		9.	0,002	0,002	-0,002	310,200
56.2	0,003	1.	0,048	0,047	0,011	12,920
		2.	0,022	-0,021	-0,007	197,600
		3.	0,049	-0,041	-0,027	213,800
		4.	0,033	0,028	0,018	33,090
		5.	0,010	0,010	0,002	13,080
		6.	0,011	-0,011	0,003	164,900
		7.	0,013	0,004	0,012	72,470
		8.	0,005	0,002	0,005	64,270
		9.	0,005	-0,005	0,000	177,300
71.8	0,005	1.	0,028	-0,028	-0,002	183,200
		2.	0,022	-0,013	0,018	126,700
		3.	0,027	-0,019	0,020	133,100
		4.	0,011	0,011	-0,001	353,700
		5.	0,016	-0,004	-0,016	255,600
		6.	0,013	-0,011	0,006	145,100
		7.	0,012	-0,012	-0,001	184,900
		8.	0,006	0,006	-0,002	343,400
		9.	0,014	-0,014	-0,005	199,200

TABLE F. ACCELERATION TARES

Transducer P06 **Acceleration Tares**

Average Orifice
Location, X/C = 0.099

Units: psi
$\Delta\alpha = 5^o$

F_D(Hz)	Steady					
24.2	-0,015	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,001	-0,001	-0,000	199,400
		2,	0,020	-0,016	-0,012	216,800
		3,	0,020	0,018	0,007	22,140
		4,	0,014	0,013	0,005	18,590
		5,	0,007	0,007	-0,002	346,400
		6,	0,003	0,001	0,002	63,350
		7,	0,006	0,004	0,004	46,890
		8,	0,016	0,003	-0,015	282,600
		9,	0,005	0,005	0,001	13,040
43.0	0,015	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,095	-0,058	0,075	127,900
		2,	0,033	0,029	-0,016	331,400
		3,	0,019	0,018	-0,006	340,600
		4,	0,059	0,039	0,044	48,500
		5,	0,009	0,003	0,009	67,920
		6,	0,002	0,001	0,001	22,240
		7,	0,009	0,005	0,008	60,790
		8,	0,017	0,017	0,004	12,700
		9,	0,010	-0,002	0,009	100,100
56.2	-0,016	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,064	0,064	0,008	6,796
		2,	0,023	-0,023	0,005	168,900
		3,	0,044	-0,042	-0,009	192,600
		4,	0,025	0,020	0,014	35,240
		5,	0,006	-0,001	0,006	97,010
		6,	0,023	-0,011	0,020	119,800
		7,	0,011	-0,000	0,011	90,680
		8,	0,014	0,014	-0,004	342,700
		9,	0,009	-0,009	-0,000	182,500
71.8	-0,005	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,022	-0,022	-0,001	183,300
		2,	0,008	-0,007	0,004	150,900
		3,	0,024	-0,017	0,017	134,000
		4,	0,011	0,010	-0,003	343,200
		5,	0,008	0,007	-0,004	332,600
		6,	0,015	-0,015	0,002	173,700
		7,	0,015	0,000	-0,015	271,500
		8,	0,009	-0,009	-0,001	187,100
		9,	0,009	0,005	0,007	52,970

TABLE G. ACCELERATION TARES

Transducer P07

Average Orifice
Location, X/C = 0.149

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady					
24.2	-0,026	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,009	-0,009	-0,001	187,100
		2.	0,014	-0,008	-0,011	234,500
		3.	0,018	0,016	0,009	28,720
		4.	0,010	0,007	0,008	47,920
		5.	0,005	0,005	0,000	0,597
		6.	0,005	0,004	0,004	46,650
		7.	0,013	0,000	0,013	89,290
		8.	0,017	0,001	-0,017	275,000
		9.	0,008	0,008	-0,001	350,500
48.0	-0,006	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,096	-0,054	0,079	124,400
		2.	0,036	0,034	-0,012	340,100
		3.	0,015	0,014	-0,006	334,100
		4.	0,048	0,028	0,039	55,760
		5.	0,009	0,005	0,007	53,300
		6.	0,004	0,003	-0,002	328,900
		7.	0,010	0,007	0,007	44,290
		8.	0,012	0,011	0,005	25,850
		9.	0,003	0,002	-0,002	310,300
56.2	-0,023	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,053	0,053	0,004	4,636
		2.	0,023	-0,022	-0,007	196,800
		3.	0,045	-0,041	-0,019	204,900
		4.	0,021	0,020	0,009	24,290
		5.	0,017	0,012	0,012	44,020
		6.	0,014	-0,009	0,011	128,300
		7.	0,010	0,001	0,010	86,810
		8.	0,009	-0,004	-0,002	194,200
		9.	0,004	0,000	0,004	84,480
71.8	-0,010	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,036	-0,036	-0,006	188,900
		2.	0,013	-0,011	0,006	151,100
		3.	0,009	-0,007	0,006	140,900
		4.	0,005	0,004	0,003	32,510
		5.	0,013	-0,004	-0,012	252,400
		6.	0,017	-0,015	0,007	154,900
		7.	0,012	-0,012	-0,001	185,300
		8.	0,003	0,003	-0,001	348,500
		9.	0,007	-0,006	-0,003	208,700

TABLE H. ACCELERATION TARES

Transducer P08

Average Orifice
Location, X/C = 0.200

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	0,005	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,008	-0,008	0,001	171,200
		2,	0,022	-0,016	-0,015	224,300
		3,	0,026	0,022	0,013	31,940
		4,	0,011	0,011	-0,002	349,500
		5,	0,023	0,023	0,003	8,500
		6,	0,019	0,009	0,017	61,110
		7,	0,021	0,021	0,005	14,670
		8,	0,024	0,002	-0,024	274,900
		9,	0,008	-0,002	-0,007	255,300
48.0	0,035	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,097	-0,046	0,085	118,400
		2,	0,052	0,049	-0,016	341,700
		3,	0,011	0,011	0,003	13,650
		4,	0,056	0,031	0,046	56,000
		5,	0,026	0,023	-0,014	329,000
		6,	0,010	0,010	-0,000	358,800
		7,	0,022	0,014	-0,017	309,300
		8,	0,022	0,020	-0,009	335,700
		9,	0,012	-0,007	-0,010	234,500
56.2	0,003	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,065	0,061	0,023	20,630
		2,	0,034	-0,013	-0,031	247,300
		3,	0,031	-0,029	-0,009	196,900
		4,	0,017	0,010	0,014	52,870
		5,	0,007	-0,004	0,005	129,100
		6,	0,018	-0,011	0,014	128,900
		7,	0,012	0,003	0,012	76,960
		8,	0,009	0,006	-0,007	307,900
		9,	0,009	0,007	-0,005	326,500
71.8	0,021	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,014	0,012	-0,007	329,300
		2,	0,005	-0,002	-0,005	245,500
		3,	0,010	-0,008	-0,007	220,900
		4,	0,012	-0,002	-0,012	259,100
		5,	0,016	-0,001	-0,016	264,900
		6,	0,009	0,008	0,004	24,430
		7,	0,013	0,009	0,010	49,630
		8,	0,009	-0,007	-0,006	223,300
		9,	0,023	-0,023	-0,006	194,400

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TABLE I. ACCELERATION TARES

Transducer P09	Acceleration Tares
Average Orifice Location, X/C = 0.250	Units: psi $\Delta\alpha = 5^{\circ}$

F_D (Hz)	Steady					
24.2	-0,013	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,003	-0,000	0,003	91,900
		2,	0,006	0,002	-0,006	288,000
		3,	0,013	-0,007	0,011	123,800
		4,	0,002	0,001	0,002	74,260
		5,	0,009	-0,007	0,006	140,100
		6,	0,002	0,001	-0,002	302,400
		7,	0,005	0,004	0,001	14,770
		8,	0,026	-0,025	0,007	163,800
		9,	0,005	-0,005	0,000	177,700
48.0	-0,012	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,011	0,009	-0,006	325,200
		2,	0,004	0,004	-0,001	339,800
		3,	0,013	0,005	-0,012	294,400
		4,	0,134	-0,054	0,123	113,700
		5,	0,014	-0,003	0,014	104,300
		6,	0,015	-0,014	0,004	162,900
		7,	0,022	0,002	0,022	84,810
		8,	0,018	-0,018	-0,005	195,200
		9,	0,007	0,004	0,006	57,100
56.2	-0,008	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,062	0,058	-0,021	340,200
		2,	0,015	-0,008	-0,012	235,200
		3,	0,031	0,007	-0,030	283,900
		4,	0,021	-0,002	0,021	95,290
		5,	0,012	0,006	0,010	61,990
		6,	0,007	-0,007	0,003	159,100
		7,	0,006	0,001	-0,006	283,100
		8,	0,021	0,011	0,018	58,920
		9,	0,004	-0,004	-0,001	198,700
71.8	-0,010	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,038	0,027	-0,027	315,700
		2,	0,010	0,005	-0,008	301,400
		3,	0,006	0,002	0,006	71,420
		4,	0,013	-0,006	-0,012	243,700
		5,	0,006	-0,006	-0,003	205,100
		6,	0,015	0,015	0,004	13,400
		7,	0,014	0,013	-0,005	339,600
		8,	0,016	0,003	-0,015	281,800
		9,	0,003	-0,001	-0,003	255,100

TABLE J. ACCELERATION TARES

Transducer P10

Average Orifice
Location, X/C = 0.30

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady					
24.2	0,009	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,003	0,002	0,002	54,370
		2.	0,002	0,002	0,002	43,490
		3.	0,004	-0,002	0,003	117,500
		4.	0,005	0,002	0,005	71,070
		5.	0,001	0,000	0,001	74,910
		6.	0,003	0,003	0,000	6,036
		7.	0,002	0,002	-0,001	343,300
		8.	0,021	-0,020	0,007	161,800
		9.	0,007	-0,006	-0,005	217,900
48.0	0,003	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,007	0,003	-0,007	290,900
		2.	0,009	-0,005	-0,008	238,500
		3.	0,020	0,014	-0,015	313,500
		4.	0,112	-0,037	0,106	109,200
		5.	0,009	-0,006	0,007	131,200
		6.	0,015	-0,015	-0,005	197,600
		7.	0,017	0,004	0,017	77,210
		8.	0,013	-0,008	0,011	126,700
		9.	0,005	-0,002	0,005	117,000
56.2	0,004	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,058	0,054	-0,021	338,700
		2.	0,008	-0,005	-0,006	233,800
		3.	0,025	0,002	-0,025	275,100
		4.	0,018	0,001	0,018	86,490
		5.	0,003	-0,001	0,002	104,500
		6.	0,008	0,003	0,007	66,440
		7.	0,001	0,000	0,001	83,700
		8.	0,014	0,006	0,013	67,410
		9.	0,008	-0,008	-0,002	193.800
71.8	0,002	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,022	0,009	-0,020	294,100
		2.	0,007	-0,006	-0,004	217,900
		3.	0,011	0,010	0,003	16,150
		4.	0,012	-0,010	-0,005	204,500
		5.	0,007	-0,005	0,005	133,900
		6.	0,005	0,003	-0,004	311.400
		7.	0,007	0,007	-0,001	355.800
		8.	0,009	0,007	-0,007	314,100
		9.	0,003	0,002	0,002	39,810

TABLE K. ACCELERATION TARES

Transducer P11

Average Orifice
Location, X/C - 0.399

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{o}$

F_D (Hz)	Steady					
24.2	-0,021	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,014	-0,012	0,007	150,300
		2,	0,008	0,008	-0,001	352,500
		3,	0,006	-0,001	0,006	95,260
		4,	0,008	-0,003	0,008	113,000
		5,	0,008	-0,005	-0,006	234,400
		6,	0,002	-0,002	0,000	174,200
		7,	0,008	0,008	-0,003	339,100
		8,	0,034	-0,033	0,004	173,200
		9,	0,011	-0,005	-0,010	243,500
48.0	-0,032	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,042	-0,041	-0,007	189,400
		2,	0,011	0,003	0,011	75,020
		3,	0,020	-0,001	-0,019	268,200
		4,	0,157	-0,097	0,123	128,200
		5,	0,015	-0,011	0,011	132,900
		6,	0,013	-0,012	-0,005	202,400
		7,	0,034	-0,004	0,034	96,200
		8,	0,017	-0,007	0,015	114,200
		9,	0,006	-0,005	0,004	143,500
56.2	-0,021	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,034	0,019	-0,028	304,100
		2,	0,004	0,004	0,001	12,130
		3,	0,029	0,000	-0,029	270,700
		4,	0,019	-0,008	0,017	113,600
		5,	0,012	-0,003	0,011	104,400
		6,	0,019	-0,012	0,015	128,700
		7,	0,007	-0,005	-0,006	228,800
		8,	0,032	-0,002	0,032	94,270
		9,	0,005	0,001	-0,005	276,400
71.8	-0,028	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,080	-0,067	-0,043	212,600
		2,	0,028	0,025	-0,011	336,200
		3,	0,026	0,019	0,018	42,970
		4,	0,018	-0,017	-0,006	198,600
		5,	0,024	0,007	0,023	72,010
		6,	0,022	0,011	0,019	60,560
		7,	0,013	0,013	0,003	15,200
		8,	0,001	-0,001	-0,001	217,000
		9,	0,006	-0,006	-0,001	192,600

TABLE L. ACCELERATION TARES

Transducer P12	Acceleration Tares
Average Orifice Location, X/C = 0.501	Units: psi $\Delta\alpha = 5^{o}$

F_D (Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	-0,010	1.	0,002	-0,000	0,002	100,500
		2,	0,005	0,005	0,002	27,030
		3,	0,005	-0,005	0,002	158,800
		4,	0,008	-0,000	0,008	90,490
		5,	0,002	0,001	0,001	40,530
		6,	0,003	0.003	0.000	4,264
		7,	0,001	0,000	-0,001	261,600
		8,	0,020	-0.020	0,003	171,400
		9,	0,009	-0.007	-0.005	216.100
48.0	-0,014	1.	0,017	0.017	0.005	16,380
		2.	0,007	-0,004	-0.005	233,300
		3,	0,020	0,020	0.003	7,381
		4,	0.127	-0.074	0.103	125,700
		5,	0,010	-0,010	-0,002	191,300
		6.	0,012	-0.012	-0,000	181,200
		7.	0,021	-0.007	0,020	109,900
		8,	0,007	-0,005	0,004	141,000
		9,	0,013	-0,010	0,009	137,900
56.2	-0,008	1.	0,084	0,084	0.002	1,264
		2,	0,018	-0,007	-0,017	246,200
		3,	0,038	0,032	-0,022	325,500
		4,	0,025	-0,016	0,019	131,000
		5,	0,006	-0,004	0,004	129,400
		6,	0,012	-0,011	0,004	160,100
		7,	0,002	-0,001	-0,001	224,300
		8,	0,014	-0,000	0,014	90,100
		9.	0,002	-0,001	-0,002	235,500
71.8	-0,009	1.	0,054	0.052	-0.014	345,000
		2,	0,023	-0,019	-0,014	216,100
		3,	0,008	0.003	-0.008	268,100
		4,	0,004	0.004	-0,002	338,200
		5,	0,012	-0,009	0.009	133,800
		6.	0,007	0,005	0.005	41,570
		7.	0,012	0,012	-0,001	353,400
		8.	0,010	0.010	-0,002	349,000
		9,	0,008	0,008	0.000	1,685

TABLE M. ACCELERATION TARES

Transducer P13

Average Orifice
Location, X/C = 0.600

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	-0,027	1.	0,006	0,005	-0,003	327,700
		2.	0,011	0,009	0,006	35,410
		3.	0,008	-0,006	0,006	134,300
		4.	0,021	0,002	0,021	85,310
		5.	0,007	-0,007	0,001	168,600
		6.	0,006	0,003	0,005	54,360
		7.	0,004	0,002	0,004	65,530
		8.	0,015	-0,015	0,003	167,900
		9.	0,006	-0,006	-0,003	210,600
48.0	-0,043	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,019	0,014	-0,013	317,200
		2.	0,013	-0,002	-0,012	259,200
		3.	0,031	0,020	-0,024	310,700
		4.	0,145	-0,081	0,120	124,100
		5.	0,017	-0,014	0,010	144,900
		6.	0,020	-0,011	0,017	122,100
		7.	0,019	0,001	0,019	87,420
		8.	0,010	0,009	0,003	15,860
		9.	0,013	0,002	0,013	82,000
56.2	-0,023	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,083	0,083	-0,001	359,000
		2.	0,015	-0,015	0,002	171,300
		3.	0,041	0,017	-0,037	294,100
		4.	0,036	-0,013	0,033	110,700
		5.	0,030	0,007	0,029	77,050
		6.	0,015	-0,006	0,014	112,400
		7.	0,016	-0,002	-0,016	263,200
		8.	0,029	-0,001	0,029	91,750
		9.	0,011	0,002	-0,011	278,600
71.8	-0,017	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,062	0,050	-0,037	323,200
		2.	0,006	0,006	0,000	0,290
		3.	0,014	0,004	-0,013	286,000
		4.	0,010	-0,010	0,001	173,400
		5.	0,013	0,003	0,013	74,960
		6.	0,017	0,007	0,016	66,630
		7.	0,017	0,015	0,007	24,740
		8.	0,013	0,012	-0,004	340,400
		9.	0,010	-0,010	0,001	176,600

TABLE N. ACCELERATION TARES

Transducer P14

Average Orifice
Location, X/C = 0.701

Acceleration Tares

Units: psi
$\Delta\alpha = 5^\circ$

F_D(Hz)	Steady					
24.2	-0,001	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,007	0.006	-0,002	343,700
		2,	0,011	0.010	-0,003	342,500
		3,	0,011	-0,010	0.004	156,100
		4,	0,002	-0,002	0,001	159,300
		5,	0,009	-0,006	-0,007	232,800
		6,	0,002	-0,002	-0,001	191,700
		7,	0,008	-0,006	0,004	144,000
		8,	0,023	-0,023	0,005	166,800
		9,	0,010	-0,008	-0,006	219,300
48.0	-0,010	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,017	0,016	-0,006	338,100
		2,	0,004	-0,003	-0,002	208,800
		3,	0,020	0,017	-0,011	328,200
		4,	0,126	-0,071	0,104	124,300
		5,	0,009	-0,005	0,007	125,600
		6,	0,007	-0,005	0,004	142,800
		7,	0,023	-0,001	0,023	92,790
		8,	0,010	0,004	0,009	67,950
		9,	0,005	-0,003	0,004	122,900
56.2	-0,009	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,083	0,082	-0,016	348,700
		2,	0,011	0,001	-0,011	273,600
		3,	0,024	0,014	-0,019	306,000
		4,	0,024	-0,006	0.023	104,200
		5,	0,010	0,005	-0,009	297,000
		6,	0,012	-0,007	0,010	127,600
		7,	0,012	-0,008	-0,010	230,900
		8,	0,019	0,002	0,019	85,230
		9,	0,011	-0,002	-0,011	260,500
71.8	-0,001	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1,	0,036	0,029	-0,022	322,500
		2,	0,014	-0,013	-0,006	206,000
		3,	0,010	0,006	0,007	41,450
		4,	0,016	-0,012	0,011	136,800
		5,	0,006	-0,005	0,002	155,300
		6,	0,008	-0,001	0,008	98,160
		7,	0,002	0,002	0,001	24,940
		8,	0,003	0,002	-0,002	314,300
		9,	0,004	-0,002	-0,004	238,000

TABLE O. ACCELERATION TARES

Transducer P15	Acceleration Tares
Average Orifice Location, X/C = 0.800	Units: psi $\Delta\alpha = 5^{\circ}$

F_D(Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	-0,013	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,004	0.003	0.002	27,100
		2.	0,004	0.004	-0.001	338,600
		3.	0,005	-0,003	0.005	120,700
		4.	0,008	-0,001	0.008	98,990
		5.	0,001	-0,001	-0,000	165,500
		6.	0,004	0,003	-0,002	323,800
		7.	0,004	-0,002	-0,004	236,400
		8.	0,023	-0,022	0.004	169,300
		9.	0,003	-0.003	0.000	179,000
48.0	-0,020	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,015	0,014	0,005	19,790
		2.	0,010	-0,004	-0.009	246,400
		3.	0,021	0,019	-0.010	332,100
		4.	0,132	-0,074	0.109	124,100
		5.	0,017	-0,017	-0.004	192,600
		6.	0,017	-0,010	0.014	125,800
		7.	0,026	0.000	0,026	89,040
		8.	0,020	0.018	0,008	22,470
		9.	0,007	0,004	0.005	55,960
56.2	-0,006	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,095	0,093	-0,016	350,100
		2.	0,010	-0,003	-0,010	250,900
		3.	0,053	0,034	-0,040	310,600
		4.	0,014	-0,006	0,012	121,900
		5.	0,003	0,003	0.001	12,900
		6.	0,013	-0,007	0.011	123,300
		7.	0,013	0,011	-0,006	332,200
		8.	0,025	-0,001	0,025	92,210
		9.	0,012	-0,003	-0.012	254,500
71.8	-0,006	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,045	0,045	-0.004	354,900
		2.	0,014	-0,014	-0.001	165,600
		3.	0,015	0,015	0,002	8,229
		4.	0,006	0,003	0,005	57,400
		5.	0,009	0.003	0,009	71,260
		6.	0,026	0,018	0,019	47,650
		7.	0,002	0,002	0,001	29,250
		8.	0,004	0,001	-0,003	293,900
		9.	0,020	-0,014	0,015	134,200

TABLE P. ACCELERATION TARES

Transducer P16

Average Orifice
Location, X/C = 0.900

Acceleration Tares

Units: psi
$\Delta\alpha = 5^{\circ}$

F_D (Hz)	Steady	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
24.2	-0,008	1,	0,001	-0,001	0,001	120,200
		2,	0,008	0,007	-0,004	329,700
		3,	0,009	-0,009	-0,003	199,400
		4,	0,013	-0,004	0,012	110,300
		5,	0,002	0,002	-0,001	336,400
		6,	0,001	0,001	-0,000	336,900
		7,	0,004	0,001	0,003	76,410
		8,	0,025	-0,025	-0,003	186,300
		9,	0,002	0,000	-0,002	273,500
48.0	-0,021	1,	0,009	0,008	0,005	31,290
		2,	0,013	-0,013	0,001	176,500
		3,	0,016	0,012	-0,010	320,500
		4,	0,147	-0,076	0,126	121,000
		5,	0,016	-0,009	0,014	122,100
		6,	0,012	-0,007	0,010	123,600
		7,	0,033	-0,008	0,032	104,300
		8,	0,017	0,017	-0,003	349,200
		9,	0,021	-0,002	0,021	95,420
56.2	-0,014	1,	0,092	0,092	-0,005	357,000
		2,	0,014	-0,011	-0,009	220,300
		3,	0,032	0,014	-0,029	296,300
		4,	0,037	-0,010	0,036	106,200
		5,	0,020	-0,018	0,008	155,400
		6,	0,014	0,009	0,011	50,220
		7,	0,012	-0,010	-0,006	213,000
		8,	0,010	-0,000	0,010	92,000
		9,	0,013	-0,013	0,001	177,200
71.8	-0,022	1,	0,040	0,029	-0,027	316,500
		2,	0,017	-0,014	-0,009	212,600
		3,	0,011	0,006	-0,010	301,300
		4,	0,009	0,009	0,002	13,030
		5,	0,023	-0,007	0,022	106,500
		6,	0,009	0,002	0,009	76,120
		7,	0,007	0,007	-0,002	346,400
		8,	0,009	0,008	0,003	19,000
		9,	0,004	0,002	0,003	54,330

TABLE Q. ACCELERATION TARES

Transducer P17

Average Orifice
Location, X/C = 0.969

Acceleration Tares

Units: psi
Δα = 5°

F_D(Hz)	Steady					
24.2	-0,029	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,003	0,003	-0,001	333,200
		2.	0,007	0,007	0,000	1,962
		3.	0,003	-0,001	0,003	120,000
		4.	0,007	0,006	0,002	15,880
		5.	0,008	0,002	-0,008	284,300
		6.	0,004	-0,002	-0,003	231,800
		7.	0,004	0,004	-0,000	356,300
		8.	0,020	-0,019	-0,008	203,200
		9.	0,014	-0,012	-0,007	212,400
48.0	-0,037	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,011	0,010	-0,005	332,000
		2.	0,008	-0,004	0,007	120,700
		3.	0,005	0,004	-0,003	322,900
		4.	0,134	-0,083	0,106	128,200
		5.	0,020	-0,020	0,004	169,600
		6.	0,018	-0,013	-0,013	224,800
		7.	0,024	0,001	0,024	86,870
		8.	0,012	-0,001	0,012	97,090
		9.	0,014	-0,002	0,014	99,720
56.2	-0,045	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,066	0,064	-0,016	346,300
		2.	0,007	-0,005	-0,005	225,900
		3.	0,027	0,014	-0,024	299,600
		4.	0,017	-0,005	0,016	107,300
		5.	0,008	0,001	0,008	80,530
		6.	0,010	-0,008	0,006	140,200
		7.	0,005	0,005	-0,000	358,300
		8.	0,021	-0,013	0,016	128,000
		9.	0,014	-0,010	-0,009	223,700
71.8	-0,024	HARM	RESULTANT	SINE COEFF	COS COEFF	PHASE
		1.	0,036	0,015	-0,032	295,700
		2.	0,011	-0,007	-0,009	232,600
		3.	0,019	0,004	0,019	77,600
		4.	0,019	-0,005	-0,019	255,800
		5.	0,002	-0,000	-0,002	265,600
		6.	0,038	0,037	0,010	15,300
		7.	0,011	-0,008	-0,007	219,800
		8.	0,015	0,002	-0,014	277,100
		9.	0,020	-0,005	0,019	104,900

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                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1        ACCELERATION TARES

            TUNED HZ     DRIVE HZ     K              MACH NO     DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT  CYCLES ANALYSED
              0.0         68.67        0.483          0.212       5.91        0.0          0.02       12007.1      20

            V            W            RN             CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP    TDR         EXT DAMP
              72.4        13406.       0.34E 07      -0.076       0.557       4.12       -0.00112      0.714       0.0
            (237.4)      (280.0)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              0.015    5.906   0   0.507 344   0.136 196   0.066 132   0.026 123   0.016 109   0.023 251   0.016  72   0.017  68
CN                 0.141    0.356  33   0.036  52   0.022 304   0.001  54   0.012 255   0.006 211   0.001 255   0.008 147   0.002  83
CM                -0.023    0.053 293   0.008 300   0.007 138   0.002 175   0.003  88   0.002  44   0.001 354   0.003 320   0.001 291

DCP 1    .010     -0.534    2.476 348   0.242 359   0.059 118   0.011 162   0.023 171   0.016 116   0.008 298   0.004 125   0.014 244
DCP 2    .020     -0.337    1.780 358   0.178 354   0.014 121   0.025 212   0.021 207   0.018 159   0.014 289   0.013 134   0.013 299
DCP 3    .030      0.049    1.478 358   0.129 346   0.016 220   0.008 126   0.023 192   0.018 244   0.015  87   0.014 144   0.009 203
DCP 4    .049     -0.023    1.205   1   0.106 359   0.015 147   0.006  20   0.029 201   0.010 155   0.013 293   0.017 216   0.008  92
DCP 5    .074      0.160    0.973   3   0.086 357   0.009 212   0.024 150   0.013 206   0.009 214   0.004 340   0.004 103   0.011 129
DCP 6    .099      0.370    0.840   8   0.080  13   0.019 284   0.029 167   0.012 264   0.015 233   0.003 240   0.006 171   0.014 266
DCP 7    .149      0.236    0.637  15   0.073  27   0.018 271   0.013 136   0.015 251   0.013 129   0.009 246   0.008   6   0.012  50
DCP 8    .200      0.252    0.564  27   0.080  42   0.025 279   0.016 292   0.015 242   0.006  45   0.005 107   0.012 262   0.019 157
DCP 9    .250      0.195    0.445  28   0.053  47   0.032 297   0.014 190   0.015 192   0.018 161   0.009  52   0.020 107   0.009 196
DCP10    .300      0.211    0.417  35   0.046  42   0.016 276   0.008 225   0.012 245   0.002 113   0.004 268   0.014 145   0.011 351
DCP11    .349      0.228    0.362  59   0.046  83   0.029 318   0.006 316   0.019 324   0.016 257   0.013 302   0.005 186   0.019  81
DCP12    .501      0.161    0.360  60   0.053  69   0.031 288   0.010  89   0.013 256   0.003  71   0.015 326   0.005 302   0.013 354
DCP13    .600      0.209    0.308  68   0.057  89   0.037 296   0.015  58   0.026 281   0.003  10   0.021  14   0.030 168   0.015 290
DCP14    .701      0.201    0.249  76   0.030 108   0.024 318   0.014 359   0.011 239   0.009 257   0.017 129   0.012  87   0.010 197
DCP15    .800      0.097    0.188  89   0.028 103   0.025 335   0.005 351   0.011 283   0.024 219   0.015 166   0.015 121   0.020  97
DCP16    .900     -0.073    0.086 103   0.029 111   0.036 293   0.021 311   0.009 191   0.019 214   0.016 228   0.013 226   0.015 302
DCP17    .964      0.010    0.049 166   0.029 243   0.037  17   0.017 145   0.022 255   0.014  72   0.020 170   0.030 111   0.026 142
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                              FORCED  PITCHING  OSCILLATION          AIRFOIL    NLR 1        ACCELERATION TARES

            TUNED HZ     DRIVE HZ     K              MACH NO     DEL.ALPHA   DEL.H       ALPHA.0      TEST POINT  CYCLES ANALYSED
              0.0         68.58        0.499          0.205       5.95        0.0          2.52       12007.2      20

            V            W            RN             CM(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP    TDR         EXT DAMP
              69.9        12655.       0.33E 07      -0.083       0.766       6.64       -0.00115      0.712       0.0
            (229.4)      (264.3)
                                                               HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA              2.520    5.966   0   0.511 345   0.150 189   0.072 136   0.006 129   0.019  14   0.016 227   0.025 123   0.002 123
CN                 0.365    0.355  34   0.050  61   0.012 329   0.007 306   0.004 199   0.001  83   0.004  22   0.006 145   0.005  98
CM                -0.020    0.357 248   0.013 294   0.006 168   0.004 156   0.000 170   0.002 302   0.001 123   0.002 283   0.002 299

DCP 1    .010      0.957    2.352 349   0.232 354   0.061 166   0.024 139   0.030 198   0.002 355   0.015 323   0.008 303   0.018  63
DCP 2    .020      0.756    1.628 358   0.187   0   0.018 183   0.016 196   0.039 179   0.007 349   0.014  57   0.006 155   0.019   4
DCP 3    .030      0.974    1.521 358   0.156 356   0.015 276   0.003 249   0.017 172   0.019 254   0.010 167   0.018 100   0.009   0
DCP 4    .049      0.362    1.249   1   0.129 358   0.013 168   0.010 229   0.030 205   0.013 264   0.012  90   0.019 244   0.004 144
DCP 5    .074      0.812    1.004   4   0.104   1   0.026 196   0.024 164   0.022 228   0.021 295   0.016  71   0.013 183   0.006  72
DCP 6    .099      0.934    0.849   9   0.097  10   0.017 216   0.012 166   0.021 232   0.022 297   0.019  73   0.026 245   0.006 220
DC  7    .149      0.645    0.638  16   0.084  27   0.026 190   0.013 223   0.014 219   0.016 312   0.026  96   0.008 149   0.011 285
DCP 8    .200      0.581    0.561  29   0.071  39   0.026 247   0.008 260   0.008 230   0.023  17   0.011 354   0.007  26   0.038  72
DCP 9    .250      0.473    0.514  26   0.070  49   0.007  30   0.005 211   0.016 208   0.003 268   0.009 228   0.022 155   0.010 324
DCP10    .300      0.471    0.457  32   0.067  52   0.019 297   0.008 226   0.007  42   0.004  85   0.012 147   0.006 164   0.012  93
DCP11    .349      0.425    0.361  57   0.070  87   0.023  17   0.018 301   0.012  87   0.013 251   0.017   6   0.008 153   0.008 117
DCP12    .501      0.277    0.363  63   0.077  79   0.017 331   0.008 224   0.012  88   0.011 114   0.007 345   0.002  50   0.006 15
DCP13    .600      0.322    0.298  72   0.062 111   0.017 327   0.010 150   0.007  95   0.014 106   0.020   3   0.017 195   0.011 133
DCP14    .701      0.277    0.259  84   0.064  86   0.024 349   0.019 359   0.025 271   0.016  75   0.004 350   0.011 118   0.001 291
DCP15    .800      0.147    0.213  95   0.039 118   0.042 341   0.011 338   0.004 262   0.004 106   0.007  67   0.015  59   0.007  66
DCP16    .900     -0.051    0.106 126   0.038  89   0.019 338   0.024 336   0.013 119   0.008  76   0.011 327   0.017 171   0.025 176
DCP17    .964      0.907    0.066 191   0.019 195   0.015  27   0.016 312   0.010 288   0.027 203   0.008 219   0.024  40   0.031  35
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                FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1        ACCELERATION TARES

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H         ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0        68.48       0.511         0.201        5.93        0.0           5.05        12007.3       20

          V            W            RN          CM(MIN)      CN(MAX)     ALPHA,NMAX    AERO DAMP    TDR          EXT DAMP
            68.3        12099.      0.32E 07    -0.081        1.025        8.71        -0.00120      0.726         0.0
          (224.0)      (252.7)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               5.053    5.929   0   0.519 345   0.149 185   0.065 136   0.021 349   0.026  28   0.017 160   0.023 129   0.081 152
CN                  0.593    0.371  35   0.353  59   0.024 353   0.010 260   0.002  43   0.004 247   0.006 291   0.005 170   0.005  76
CM                 -0.019    0.057 297   0.014 282   0.009 180   0.004 119   0.003 257   0.001  47   0.002 109   0.002 344   0.002 266

DCP 1     .010      2.538    2.438 349   0.219 324   0.092 168   0.038  94   0.037 236   0.011 104   0.018 294   0.015 162   0.013 312
DCP 2     .020      1.940    1.882 358   0.179   1   0.024 184   0.019 119   0.020 215   0.013 189   0.011 270   0.010  15   0.029  11
DCP 3     .030      1.977    1.594 356   0.142   0   0.016 198   0.023 108   0.026 231   0.003 279   0.008 332   0.005  25   0.006 332
DCP 4     .049      1.606    1.306   2   0.125 358   0.019 166   0.017 148   0.033 256   0.008 203   0.007 269   0.008 273   0.006 268
DCP 5     .074      1.483    1.029   4   0.104 357   0.017 197   0.025 175   0.024 245   0.002 142   0.013  55   0.010  94   0.010 117
DCP 6     .099      1.481    0.873  10   0.090  11   0.014 292   0.023 169   0.014 286   0.014 285   0.004 186   0.009 302   0.008 302
DCP 7     .149      1.071    0.678  17   0.063  26   0.009 293   0.015 219   0.014 236   0.023 283   0.015 208   0.002 107   0.008 123
DCP 8     .200      0.916    0.586  28   0.070  44   0.038 284   0.013 265   0.017 283   0.005 273   0.006 177   0.011 285   0.022  90
DCP 9     .250      0.753    0.516  30   0.080  54   0.020 323   0.016 131   0.017 301   0.011 155   0.017 252   0.011 129   0.012 199
DCP10     .300      0.718    0.459  36   0.066  41   0.025 331   0.010 275   0.005 149   0.014  76   0.013 338   0.029 154   0.015 304
DCP11     .399      0.635    0.386  59   0.068  87   0.040   3   0.027 306   0.023  40   0.014 227   0.005  22   0.012 220   0.008  71
DCP12     .501      0.431    0.373  62   0.077  60   0.045 353   0.019 252   0.006 178   0.010 302   0.014 335   0.004 222   0.004 291
DCP13     .600      0.417    0.311  72   0.076  89   0.042 354   0.025 252   0.009  98   0.017 263   0.016 286   0.003  68   0.010 311
DCP14     .731      0.362    0.258  83   0.065  62   0.026  15   0.029 289   0.009  57   0.004 276   0.011 303   0.003 179   0.019  82
DCP15     .830      0.182    0.239  94   0.043  88   0.034   5   0.013 248   0.017  45   0.014 191   0.013 263   0.012  65   0.009 119
DCP16     .900     -0.031    0.108 118   0.025  99   0.036 343   0.010   6   0.018  52   0.023  57   0.008 119   0.017 219   0.029 148
DCP17     .969     -0.006    0.020 165   0.030 115   0.050  63   0.028  13   0.031 181   0.023 235   0.009 265   0.024 150   0.041  19
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                FORCED  PITCHING  OSCILLATION            AIRFOIL     NLR 1        ACCELERATION TARES

          TUNED HZ    DRIVE HZ     K            MACH NO      DEL.ALPHA   DEL.H         ALPHA.0      TEST POINT   CYCLES ANALYSED
            0.0        68.50       0.511         0.201        5.93        0.0           7.54        12007.4       20

          V            W            RN          CM(MIN)      CN(MAX)     ALPHA,NMAX    AERO DAMP    TDR          EXT DAMP
            68.3        12104.      0.32E 07    -0.085        1.248       11.64        -0.00136      0.822         0.0
          (224.1)      (252.8)
                                                      HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               7.542    5.930   0   0.509 344   0.159 186   0.062 129   0.026 353   0.020  12   0.022 192   0.024 114   0.005 198
CN                  0.606    0.303  36   0.060  65   0.015 302   0.010 255   0.003 290   0.009 251   0.007 331   0.006 109   0.005  99
CM                 -0.010    0.063 292   0.014 290   0.004 130   0.003  67   0.002 265   0.003  84   0.002 134   0.002 257   0.001 270

DCP 1     .010      3.645    2.155 347   0.291  34   0.153 339   0.065 226   0.057 245   0.061 206   0.024 146   0.025 122   0.012  72
DCP 2     .020      3.042    1.892 358   0.185   1   0.019 131   0.028 160   0.027 278   0.027 139   0.012 355   0.013 254   0.017 331
DCP       .030      2.932    1.596 358   0.149 359   0.012 128   0.015 142   0.019 272   0.009 207   0.007 126   0.017 193   0.004 224
DCP 4     .049      2.418    1.312   1   0.145   5   0.027  90   0.012  36   0.040 264   0.013 162   0.018 295   0.019 215   0.025  44
DCP 5     .074      2.140    1.067   4   0.108   7   0.014 126   0.004  98   0.023 263   0.010 236   0.003 293   0.020 136   0.019  72
DCP 6     .099      2.012    0.894   9   0.093  19   0.007 316   0.005  83   0.022 272   0.001 137   0.003 208   0.022 163   0.012  57
DCP 7     .149      1.474    0.678  16   0.093  36   0.015 293   0.021 265   0.006 304   0.015 314   0.015  74   0.007 103   0.010 132
DCP 8     .200      1.236    0.599  29   0.079  53   0.002  46   0.006  47   0.019 281   0.008  15   0.024 339   0.008 275   0.022 121
DCP 9     .250      1.029    0.537  31   0.079  51   0.027 245   0.005 328   0.010 260   0.014 263   0.009 327   0.010  53   0.003 107
DCP10     .300      0.946    0.452  38   0.062  49   0.026 248   0.012 282   0.009 242   0.013 241   0.004   5   0.016  48   0.010 122
DCP11     .399      0.815    0.402  62   0.078  86   0.026 318   0.016 314   0.022  50   0.024 240   0.012 353   0.010  72   0.009 196
DCP12     .501      0.574    0.410  62   0.079  84   0.025 290   0.024 253   0.006 268   0.007 177   0.017 301   0.012 109   0.006 278
DCP13     .600      0.507    0.348  71   0.070 101   0.029 283   0.014 253   0.003  37   0.005 113   0.010 340   0.017 150   0.004 180
DCP14     .701      0.422    0.266  82   0.055  79   0.014 324   0.027 251   0.007 238   0.022 276   0.002 144   0.006 291   0.006  11
DCP15     .800      0.225    0.215  90   0.057 100   0.027 318   0.015 221   0.006  56   0.016 227   0.003  46   0.010  67   0.014  61
DCP16     .900     -0.018    0.130 106   0.045 109   0.012 276   0.012 165   0.022  99   0.022 314   0.001 330   0.016  83   0.013 150
DCP17     .969     -0.012    0.059 138   0.028 109   0.028  48   0.013 357   0.011 267   0.011 109   0.024 197   0.010  23   0.020  61
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1       ACCELERATION TARES

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0        66.15       0.519       0.199      5.93        0.0         10.04       12007.5      20

              V           Q          RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                67.7       11917.     3.32E 07   -0.074      1.489       13.68       -0.00141     0.844       0.0
              (222.1)     (248.9)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             10.038     5.927   0   0.900 344   0.156 183   0.067 117   0.046 346   0.018  12   0.030 185   0.020 136   0.005 185
CN                 1.016     0.365  37   0.366  56   0.022 318   0.009 308   0.009   9   0.014 248   0.003 142   0.003 163   0.008 119
CM                -0.005     0.064 290   0.013 269   0.008 157   0.005 100   0.004 216   0.005  66   0.002 331   0.001 357   0.003 309

DCP 1     .010     5.097     1.924 348   0.279  16   0.149 156   0.162  45   0.023 145   0.073  16   0.028 358   0.029  10   0.015 319
DCP 2     .020     4.206     1.864 358   0.189   5   0.022 245   0.025  80   0.021 263   0.013   0   0.009 167   0.011 173   0.009  72
DCP 3     .030     3.881     1.596 358   0.153   0   0.031 279   0.018  79   0.024 264   0.013 302   0.008 152   0.008 135   0.003 282
DCP 4     .049     3.238     1.309   1   0.160  13   0.009  84   0.008 170   0.025 272   0.027 164   0.022 304   0.018 199   0.011  58
DCP 5     .074     2.789     1.033   5   0.099  14   0.017 205   0.009 186   0.024 225   0.013 180   0.015  69   0.007 145   0.025 115
DCP 6     .099     2.541     0.875  10   0.093  24   0.012 228   0.018 179   0.015 330   0.008 288   0.005 194   0.014 210   0.011 110
DCP 7     .149     1.884     0.679  17   0.089  36   0.013 320   0.020 176   0.014 268   0.012 291   0.005  64   0.003  43   0.010 330
DCP 8     .200     1.562     0.588  26   0.086  51   0.027 270   0.003  71   0.013 295   0.012 178   0.012 304   0.011 182   0.010  72
DCP 9     .250     1.309     0.557  29   0.075  44   0.017 252   0.016  78   0.021 327   0.014 181   0.009 327   0.013 271   0.015  48
DCP10     .300     1.170     0.470  36   0.069  51   0.023 248   0.010 348   0.006 309   0.004 167   0.005  73   0.015  76   0.009  40
DCP11     .399     0.944     0.410  62   0.080  84   0.063 331   0.036 348   0.023  41   0.024 247   0.005  38   0.003 327   0.015 135
DCP12     .501     0.707     0.404  63   0.076  61   0.033 317   0.020 324   0.017  73   0.013 292   0.012 230   0.006 104   0.014 184
DCP13     .600     0.591     0.329  73   0.069  72   0.044 308   0.023 307   0.019 356   0.025 254   0.008 178   0.010 103   0.023 179
DCP14     .701     0.466     0.300  83   0.071  84   0.024 356   0.083 272   0.016  27   0.025 266   0.011  83   0.095 176   0.006  88
DCP15     .800     0.236     0.288  94   0.056  84   0.087 334   0.010 271   0.013 314   0.027 248   0.018 137   0.008 202   0.017  62
DCP16     .900     0.009     0.133  90   0.065  75   0.027 336   0.064 238   0.028  76   0.014 264   0.007 125   0.015 237   0.008 163
    17    .969    -0.003     0.040 111   0.022  52   0.021  49   0.331  57   0.324  12   0.031 184   0.015 206   0.011 109   0.027 104
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                         FORCED  PITCHING  OSCILLATION           AIRFOIL     NLR 1       ACCELERATION TARES

              TUNED HZ   DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.0     TEST POINT  CYCLES ANALYSED
               0.0        67.57       0.508       0.199      5.90        0.0         12.52       12007.6      20

              V           Q          RN          CM(MIN)     CN(MAX)     ALPHA,NMAX  AERO DAMP   TDR         EXT DAMP
                67.7       11937.     3.32E 07   -0.060      1.595       16.59       -0.00123     0.739       0.0
              (222.2)     (249.3)
                                                             HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA             12.526     5.902   0   0.496 343   0.151 184   0.057 120   0.043 339   0.019  60   0.024 181   0.011 103   0.005 201
CN                 1.155     0.381  33   0.059  62   0.014 311   0.011 316   0.006  44   0.007 223   0.009 135   0.002 120   0.004 123
CM                -0.002     0.095 291   0.017 275   0.005 137   0.005 130   0.005 267   0.001  43   0.002 317   0.000 263   0.001 325

DCP 1     .010     5.031     1.581 359   0.404 339   0.216 170   0.151 170   0.031 184   0.077 173   0.029 171   0.015  86   0.051 209
DCP 2     .020     4.974     1.780   1   0.306   1   0.044 199   0.040  91   0.035 243   0.013 213   0.009  44   0.008  30   0.002  19
DCP 3     .030     4.614     1.970 357   0.164 359   0.033 127   0.072  43   0.334 258   0.007 293   0.013   9   0.008 151   0.013 330
DCP 4     .049     3.666     1.317   8   0.202 331   0.073 145   0.062  40   0.062 278   0.028 197   0.011 274   0.007 137   0.014  64
DCP 5     .074     3.142     1.077  10   0.128 328   0.069 130   0.010   0   0.026 256   0.012 111   0.014 105   0.017 178   0.019 135
DCP 6     .099     2.662     0.917  12   0.069 336   0.034  77   0.021 244   0.006 292   0.011 201   0.004 105   0.006 209   0.006  86
DCP 7     .149     2.141     0.717  14   0.029   0   0.019  29   0.015 222   0.019 262   0.004 240   0.012  81   0.013  83   0.008  82
DCP 8     .200     1.832     0.662  14   0.066 120   0.052   9   0.010 245   0.031 347   0.022 179   0.008 138   0.014 100   0.025  62
DCP 9     .250     1.515     0.520  23   0.118  75   0.053 300   0.015 106   0.033 330   0.031 182   0.010 107   0.006 113   0.007  23
DCP10     .300     1.350     0.451  29   0.108  72   0.048 285   0.021  72   0.016   2   0.005 334   0.014  81   0.013 116   0.009 114
DCP11     .399     1.117     0.360  56   0.102  92   0.024 305   0.021   9   0.026  72   0.031 304   0.037 147   0.012 317   0.017 101
DCP12     .501     0.803     0.364  59   0.089  77   0.026 285   0.021 315   0.016 110   0.010 211   0.012 179   0.011 269   0.006 129
DCP13     .600     0.638     0.326  70   0.056  86   0.026 287   0.019 315   0.014  62   0.009  21   0.008 227   0.008 129   0.004   7
DCP14     .701     0.507     0.278  81   0.070  74   0.011 357   0.063 300   0.005 195   0.001  81   0.008 160   0.007  93   0.013 273
DCP15     .800     0.262     0.216  90   0.052  90   0.030 356   0.016 307   0.011  25   0.010 201   0.008 136   0.009  24   0.002 110
DCP16     .900     0.038     0.099 105   0.054  86   0.035 284   0.020 249   0.034 108   0.021 212   0.023 109   0.003 221   0.007 162
DCP17     .969     0.030     0.047  79   0.026  37   0.025  92   0.020  64   0.020  56   0.009 144   0.014 332   0.010 131   0.026 104
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                 FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1        ACCELERATION TARES

          TUNNEL HZ    DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H        ALPHA.O     TEST POINT   CYCLES ANALYSED
            0.0          67.31        0.504      0.200       5.90        0.0          15.07       12007.7      20

          V             Q           RN         CMMIN       CNMAX       ALPHA.NMAX   AERO DAMP   TDR          EXT DAMP
           67.9          12018.      3.32E 07   -0.066       1.589       19.06       -0.00016     0.095        0.0
          (222.9)       (251.0)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            15.072     5.897   0   0.967 337   0.116 194   0.065 148   0.063 359   0.021 116   0.007 152   0.020 180   0.012  15
CN                1.219     0.636  10   0.114  85   0.036 304   0.019 330   0.010 221   0.007 190   0.005 183   0.004 334   0.007 142
CM               -0.017     0.013 350   0.042 251   0.013  46   0.003 165   0.002 271   0.001 169   0.003 348   0.002 158   0.000  43

DCP 1    .010     4.657     1.490  53   0.736 343   0.427 284   0.126 192   0.080 137   0.098 301   0.042 248   0.034 200   0.019 343
DCP 2    .020     4.440     1.441  30   0.906 351   0.250 297   0.207 170   0.061  47   0.020  38   0.015 273   0.050 137   0.042  33
DCP 3    .030     4.241     1.468  26   0.265 301   0.113 336   0.096 149   0.222 212   0.074 354   0.063 189   0.027  56   0.044 345
DCP 4    .044     3.714     1.562  23   0.436 339   0.297 153   0.158  43   0.084 284   0.068 209   0.025 114   0.031  60   0.018  18
DCP 5    .076     3.105     1.391  19   0.959 274   0.264 118   0.137 359   0.091 254   0.048 167   0.044  51   0.022 334   0.024 168
DCP 6    .099     2.916     1.291  14   0.276 239   0.230  86   0.109 324   0.065 230   0.026 120   0.029  39   0.036 283   0.039 123
DCP 7    .144     2.325     1.132   7   0.253 182   0.158  69   0.130 328   0.136 218   0.053 114   0.039  74   0.020 298   0.031 140
DCP 8    .200     2.043     0.986 356   0.237 159   0.135  83   0.106 342   0.078 238   0.083 123   0.051   6   0.020 236   0.060 152
DCP 9    .250     1.763     0.799 342   0.325 123   0.137  23   0.159 273   0.051 136   0.047  36   0.042 276   0.032 156   0.032 114
DCP10    .300     1.538     0.598 338   0.298 102   0.114 343   0.070 236   0.058 111   0.035 339   0.045 222   0.023  63   0.006 168
DCP11    .399     1.248     0.320 342   0.345  99   0.143 321   0.045 153   0.061  44   0.023 237   0.030 187   0.023 347   0.011  13
DCP12    .501     0.871     0.194   3   0.244  75   0.116 270   0.036 135   0.058 347   0.027 141   0.007 109   0.013 230   0.010 224
DCP13    .600     0.653     0.108  26   0.197  67   0.093 245   0.053  46   0.037 273   0.015  55   0.006 301   0.022 126   0.015 281
DCP14    .701     0.471     0.084  85   0.171  57   0.080 207   0.049  12   0.037 241   0.018  68   0.018 224   0.031 354   0.022 238
DCP15    .800     0.295     0.136 115   0.125  52   0.069 173   0.040 328   0.024 130   0.014 314   0.021 157   0.024 305   0.017 130
DCP16    .900     0.149     0.101 111   0.079  35   0.042 164   0.028 280   0.031 155   0.005 249   0.033 123   0.024 249   0.010  13
DCP17    .969     0.046     0.031 129   0.039  99   0.028 122   0.009  54   0.023  76   0.008 246   0.008 315   0.038  82   0.022  83


                 FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1        ACCELERATION TARES

          TUNNEL HZ    DRIVE HZ     K          MACH NO     DEL.ALPHA   DEL.H        ALPHA.O     TEST POINT   CYCLES ANALYSED
            0.0          66.74        0.516      0.200       5.96        0.0          17.96       12007.8      20

          V             Q           RN         CMMIN       CNMAX       ALPHA.NMAX   AERO DAMP   TDR          EXT DAMP
           67.8          12023.      3.32E 07   -0.259       1.799       23.99        0.00113    -0.682        0.0
          (222.6)       (251.1)
                                                           HARMONIC ANALYSIS
DATA
TYPE     X/C      RES 0     RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA            17.961     5.962   0   0.486 331   0.130 203   0.053 115   0.051   1   0.024  58   0.025 176   0.016 125   0.005 311
CN                1.325     0.568 358   0.134 104   0.034 271   0.036  53   0.013 245   0.010  19   0.008 199   0.011 153   0.035 347
CM               -0.077     0.074  94   0.076 243   0.322  66   0.006 234   0.006  13   0.006 229   0.001 294   0.003  59   0.002  78

DCP 1    .010     4.285     2.467  95   0.351 357   0.281 334   0.281 316   0.238 257   0.154 210   0.103 117   0.119  49   0.105 344
DCP 2    .020     3.984     2.623  45   0.519 332   0.201 233   0.132  88   0.101   8   0.119 209   0.114 190   0.128 109   0.101  36
DCP 3    .030     3.817     2.443  40   0.579 336   0.412 256   0.217 152   0.184 105   0.182   7   0.115 317   0.122 242   0.096 183
DCP 4    .044     3.480     2.162  36   0.595 296   0.207 206   0.142 129   0.109  36   0.071 330   0.047 274   0.059 180   0.038 162
DCP 5    .076     3.065     1.894  25   0.423 277   0.230 196   0.209 102   0.110  25   0.094 319   0.086 251   0.089 143   0.072  87
DCP 6    .099     2.798     1.766  20   0.361 259   0.251 170   0.142  80   0.142 357   0.082 283   0.102 217   0.068 123   0.052  42
DCP 7    .144     2.311     1.630   5   0.386 232   0.245 142   0.176  68   0.140 328   0.094 250   0.096 164   0.077  66   0.082 351
DCP 8    .200     2.035     1.451   4   0.349 220   0.219 133   0.205  59   0.141 309   0.100 210   0.075 113   0.043  46   0.035 343
DCP 9    .250     1.765     1.256 347   0.446 177   0.269  79   0.286 349   0.209 279   0.127 141   0.125  51   0.069 316   0.063 199
DCP10    .300     1.601     1.051 340   0.434 156   0.263  42   0.326 297   0.162 164   0.116  77   0.088 318   0.033 230   0.019  95
DCP11    .399     1.393     0.736 333   0.553 140   0.309  12   0.184 255   0.113 139   0.088  36   0.053 287   0.077 175   0.023  20
DCP12    .501     1.109     0.571 317   0.508 107   0.303 312   0.141 166   0.072  67   0.062 318   0.056 154   0.019  87   0.033 262
DCP13    .600     0.902     0.383 287   0.529  81   0.288 271   0.156 111   0.078 330   0.044 205   0.024  64   0.010 103   0.020 210
DCP14    .701     0.752     0.220 237   0.451  47   0.203 232   0.129  72   0.087 258   0.048  80   0.029 267   0.009 225   0.006 343
DCP15    .800     0.595     0.182 188   0.323  21   0.125 207   0.064  13   0.063 184   0.023 340   0.028 163   0.013 202   0.006 202
DCP16    .900     0.248     0.087 162   0.169 358   0.078 202   0.077  12   0.068 145   0.037 347   0.042  44   0.016 243   0.025 329
DCP17    .969     0.163     0.122 196   0.164 346   0.084 104   0.038 224   0.056 334   0.067  96   0.048 210   0.025 307   0.024 110
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                      FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1        ACCELERATION TARES

               TUNED HZ      DRIVE HZ      K             MACH NO      DEL.ALPHA     DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0           68.82         0.520         0.198        5.93          0.0          19.97        12007.9       20

               V             Q             RN            CM(MIN)      CN(MAX)       ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                67.3          11846.        0.32E 07     -0.319        2.073         25.94        0.00222     -1.330         0.0
               (220.9)       (247.4)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA              19.973     5.931   0    0.532 332    0.100 210    0.060 138    0.045  19    0.015  46    0.018 193    0.019 132    0.003  41
CN                  1.442     0.659   6    0.056 154    0.033 337    0.032 174    0.009  40    0.016 107    0.003  57    0.011 347    0.008 263
CM                 -0.136     0.115  73    0.059 266    0.020 174    0.013  32    0.009 176    0.008 334    0.003  57    0.004 251    0.002  27

DCP 1     .010      3.621     2.713  68    0.619  52    0.230 323    0.132 358    0.234  26    0.163 356    0.135 282    0.151 245    0.127 179
DCP 2     .020      3.413     2.628  62    0.646  43    0.295 318    0.237 256    0.154 161    0.127  94    0.060  43    0.059 328    0.063 313
DCP 3     .030      3.346     2.517  57    0.634  25    0.416 305    0.208 262    0.269 199    0.178 151    0.169  95    0.126  67    0.135   3
DCP 4     .049      3.264     2.284  49    0.595 347    0.353 278    0.237 209    0.135 178    0.175 117    0.105  73    0.110  15    0.122 338
DCP 5     .074      2.402     2.019  40    0.519 325    0.399 252    0.283 174    0.137 129    0.152  69    0.081  22    0.107 329    0.079 274
DCP 6     .099      2.724     1.842  32    0.461 338    0.358 233    0.275 157    0.147  99    0.134  39    0.057 327    0.094 292    0.069 230
DCP 7     .149      2.307     1.740  20    0.524 286    0.319 213    0.293 136    0.116  65    0.146   0    0.085 298    0.100 219    0.091 165
DCP 8     .200      2.063     1.698  19    0.598 271    0.361 199    0.305 108    0.164  39    0.142 333    0.071 265    0.054 213    0.051 134
DCP 9     .250      1.900     1.564   6    0.649 234    0.406 143    0.361  51    0.208 315    0.149 243    0.082 169    0.076  74    0.075  20
DCP10     .300      1.767     1.368 358    0.590 213    0.384 104    0.306   4    0.184 263    0.114 184    0.074 117    0.066   9    0.076 303
DCP11     .399      1.596     1.017 349    0.622 185    0.435  63    0.268 318    0.114 204    0.080 136    0.045  94    0.055 313    0.039 228
DCP12     .501      1.313     0.796 329    0.582 143    0.414  12    0.251 242    0.114 123    0.046  26    0.033   8    0.025 168    0.017 116
DCP13     .600      1.143     0.563 302    0.524 110    0.375 333    0.221 195    0.073  67    0.025 320    0.030  14    0.015  53    0.027  11
DCP14     .701      0.967     0.364 262    0.432  73    0.271 291    0.122 126    0.040 327    0.020 197    0.009 134    0.005 256    0.035 266
DCP15     .800      0.745     0.251 221    0.307  46    0.194 255    0.091  82    0.029 232    0.013 211    0.033 127    0.014 221    0.005 295
DCP16     .900      0.417     0.245 203    0.264   5    0.073 164    0.086 170    0.088 340    0.075  94    0.055 235    0.039  32    0.035 170
DCP17     .969      0.336     0.397 214    0.348 352    0.236 120    0.177 248    0.143  24    0.143 161    0.089 282    0.080  81    0.013 170

                      FORCED  PITCHING  OSCILLATION            AIRFOIL    NLR 1        ACCELERATION TARES

               TUNED HZ      DRIVE HZ      K             MACH NO      DEL.ALPHA     DEL.H        ALPHA.O      TEST POINT   CYCLES ANALYSED
                0.0           23.12         0.113         0.308        5.14          0.0          0.03         12009.1       20

               V             Q             RN            CM(MIN)      CN(MAX)       ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
                104.4         28259.        0.49E 07     -0.036        0.558         5.24        -0.00081       0.686        0.0
               (342.5)       (590.2)                                  HARMONIC ANALYSIS
DATA
TYPE      X/C       RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               0.048     5.136   0    0.238   5    0.050 258    0.004 125    0.007  53    0.029  76    0.034 187    0.041 [illegible] 0.004 308
CN                  0.126     0.430 355    0.016   2    0.001 124    0.001 237    0.003 272    0.001 106    0.005 211    0.015 214    0.001  49
CM                 -0.018     0.012 303    0.002 355    0.001   1    0.000 104    0.001  82    0.001 182    0.002  24    0.006  22    0.001 203

DCP 1     .010     -0.632     3.101 347    0.233  31    0.043 106    0.019 190    0.004 267    0.015 131    0.004 323    0.022 326    0.011 170
DCP 2     .020     -0.331     2.241 350    0.091 351    0.016 353    0.006 217    0.005 339    0.015 155    0.008 350    0.018 349    0.009 195
DCP 3     .030     -0.015     1.868 350    0.074 334    0.012 340    0.005 243    0.004 282    0.005 143    0.001 260    0.013 348    0.005 201
DCP 4     .049      0.106     1.517 350    0.061 334    0.015 358    0.007 211    0.004 208    0.005 126    0.004  46    0.019 349    0.005 312
DCP 5     .074      0.276     1.213 350    0.049 348    0.008 341    0.005 213    0.003 189    0.008 138    0.002  39    0.015 340    0.003 161
DCP 6     .099      0.365     1.053 351    0.044 354    0.014 335    0.005 173    0.003 184    0.003  94    0.002 343    0.014 323    0.006 199
DCP 7     .149      0.231     0.763 352    0.035   7    0.007   9    0.002  36    0.005 312    0.007 170    0.006 332    0.009 325    0.005 163
DCP 8     .200      0.205     0.640 355    0.032   1    0.010  21    0.005 161    0.004 322    0.008 176    0.008 334    0.011 359    0.005 195
DCP 9     .250      0.175     0.559 354    0.026   7    0.003 144    0.002 141    0.003 235    0.001  93    0.007 178    0.023 202    0.003 334
DCP10     .300      0.190     0.466 355    0.018 358    0.002 178    0.003  27    0.006 255    0.003  48    0.006 182    0.015 200    0.004 205
DCP11     .399      0.183     0.371   1    0.010  18    0.005 143    0.004   0    0.010 285    0.003  54    0.008 214    0.024 211    0.003 332
DCP12     .501      0.120     0.283   4    0.008   9    0.008 150    0.003 283    0.003 318    0.001 220    0.006 223    0.021 209    0.003 142
DCP13     .600      0.151     0.220   6    0.005  35    0.005 154    0.008 245    0.003 258    0.003 281    0.007 171    0.024 209    0.004  31
DCP14     .701      0.195     0.156   5    0.002  34    0.005 201    0.001 188    0.002 271    0.003 292    0.008 189    0.024 202    0.004  49
DCP15     .800      0.096     0.094  14    0.001 109    0.001 118    0.001 154    0.004 353    0.003  21    0.010 217    0.023 210    0.004  28
DCP16     .900     -0.061     0.029 [illegible] 0.005 200 0.002 224  0.007  28    0.008 232    0.002 359    0.005 218    0.017 190    0.006   8
DCP17     .969     -0.028     0.022 215    0.006 194    0.006 199    0.009 224    0.003 169    0.009  65    0.012 198    0.023 208    0.002 280
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1        ACCELERATION TARES

             TUNED HZ    DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0         23.19        0.115         0.304       5.15         0.0           2.46        12009.2       20

             V           Q             RN            CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              102.9       27617.        0.49E 07     -0.030        0.785         7.53       -0.00091      0.753        0.0
             (337.7)     (576.8)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               2.455    5.155   0    0.233   8    0.049 261    0.005 203    0.015  24    0.011  89    0.023 162    0.006 142    0.006  21
CN                  0.358    0.433 355    0.010  16    0.003  47    0.002 301    0.001 271    0.001 232    0.001  94    0.002  29    0.002 359
CM                 -0.014    0.014 244    0.002 272    0.001 297    0.001 139    0.001 355    0.001 155    0.001 348    0.001 221    0.000 175

DCP 1    .010       1.005    2.694 347    0.124   9    0.016   1    0.008 179    0.014 254    0.014 174    0.006   1    0.001 197    0.016 302
DCP 2    .020       0.850    2.244 350    0.004 350    0.040 327    0.003  55    0.012 300    0.019 194    0.007 114    0.005  66    0.015 310
DCP 3    .030       0.989    1.965 350    0.070 355    0.032 334    0.003 169    0.015 318    0.012 191    0.009  60    0.003 155    0.011 330
DCP 4    .044       0.929    1.563 350    0.050 344    0.022 352    0.006 165    0.006 290    0.004 213    0.002   2    0.001 303    0.012 354
DCP 5    .074       0.462    1.239 350    0.045 350    0.017 334    0.008 198    0.006 303    0.002 153    0.003 268    0.001  67    0.004 303
DCP 6    .099       0.924    1.064 351    0.044   1    0.011 332    0.004 156    0.004 311    0.001 257    0.002 295    0.002 160    0.004 305
DCP 7    .149       0.600    0.600 352    0.035   3    0.007   0    0.005 229    0.003  80    0.005 169    0.003  36    0.003 160    0.005 329
DCP 8    .200       0.553    0.612 355    0.030   6    0.014   5    0.002  70    0.009 335    0.005 213    0.005 348    0.003 219    0.005  86
DCP 9    .250       0.470    0.567 355    0.028  13    0.008 200    0.003  31    0.001 171    0.001 218    0.002 317    0.005  22    0.006  82
DCP10    .300       0.447    0.475 355    0.023  21    0.001 298    0.005 318    0.003  75    0.006 213    0.004   4    0.003 330    0.002 341
DCP11    .399       0.325    0.371   1    0.013  32    0.005 105    0.004 322    0.005 286    0.002 123    0.002 356    0.004 350    0.002 326
DCP12    .501       0.272    0.293   4    0.011  37    0.013 121    0.001 269    0.003 265    0.002  95    0.005 100    0.002 297    0.001 158
DCP13    .600       0.264    0.224   6    0.014  49    0.011 103    0.008 270    0.005 199    0.004 338    0.004 144    0.002 240    0.010  56
DCP14    .701       0.275    0.154  10    0.010  49    0.007  76    0.004   6    0.000 177    0.008  10    0.007 140    0.006  40    0.004   8
DCP15    .800       0.142    0.092  17    0.010  42    0.007  34    0.004 259    0.003  67    0.002 309    0.004 154    0.003  37    0.003  22
DCP16    .900      -0.048    0.029  26    0.006  83    0.007 314    0.008 346    0.003 162    0.005 228    0.006 267    0.005  46    0.007 261
DCP17    .969      -0.034    0.013 203    0.002 332    0.011 172    0.001 237    0.004 264    0.001 263    0.002 274    0.005  92    0.003 278
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                    FORCED  PITCHING  OSCILLATION          AIRFOIL     NLR 1        ACCELERATION TARES

             TUNED HZ    DRIVE HZ     K             MACH NO      DEL.ALPHA    DEL.H        ALPHA.0      TEST POINT   CYCLES ANALYSED
              0.0         23.16        0.115         0.302       5.15         0.0           5.01        12009.3       20

             V           Q             RN            CN(MIN)      CN(MAX)      ALPHA.NMAX   AERO DAMP    TDR          EXT DAMP
              102.1       27273.        0.48E 07     -0.026        1.009         9.80       -0.00094      0.780        0.0
             (335.1)     (569.6)
                                                       HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA               5.009    5.147   0    0.237   8    0.036 257    0.033 305    0.013 351    0.006 213    0.027 229    0.005 225    0.004  77
CN                  0.594    0.426 356    0.022  19    0.006  44    0.005 248    0.002 321    0.002 202    0.006 350    0.010 334    0.004 222
CM                 -0.009    0.015 304    0.002 277    0.001 284    0.001 106    0.000 206    0.000   4    0.001 185    0.002 144    0.001  60

DCP 1    .010       2.563    2.771 347    0.150  16    0.076 340    0.055 224    0.017 154    0.013 145    0.007 339    0.027 352    0.005 223
DCP 2    .020       2.098    2.259 350    0.104 357    0.026 352    0.011 220    0.032 325    0.037 155    0.010 341    0.025   1    0.009 197
DCP 3    .030       2.015    1.913 350    0.087 354    0.013 355    0.002 415    0.005 220    0.000 253    0.007 344    0.014 359    0.037 207
DCP 4    .044       1.747    1.588 350    0.070 348    0.019 355    0.006 123    0.004 262    0.007 251    0.012 343    0.016   9    0.005 152
DCP 5    .074       1.632    1.256 351    0.056 358    0.020 356    0.008 178    0.007 305    0.005 209    0.010 335    0.013 352    0.011 180
DCP 6    .099       1.510    1.061 351    0.050   0    0.015 358    0.005 188    0.005 315    0.005 227    0.008 350    0.012 347    0.008 175
DCP 7    .149       1.098    0.788 353    0.033   5    0.011 340    0.011 195    0.011 298    0.006 215    0.009   5    0.015 338    0.002 164
DCP 8    .200       0.905    0.644 356    0.035  10    0.017  20    0.008 196    0.006   2    0.003 183    0.010 343    0.011 345    0.009 193
DCP 9    .250       0.774    0.557 356    0.030  13    0.008 159    0.005 255    0.003  73    0.005 186    0.001 355    0.011 324    0.002 284
DCP10    .300       0.706    0.461 356    0.022  22    0.006  64    0.002 259    0.006 278    0.005 153    0.005 302    0.010 313    0.004 234
DCP11    .399       0.592    0.364   1    0.018  36    0.012  89    0.004 308    0.008 314    0.002 233    0.010 343    0.008 336    0.007 251
DCP12    .501       0.429    0.280   5    0.018  30    0.008 109    0.007 265    0.002 166    0.001 244    0.005 335    0.010 334    0.002 297
DCP13    .600       0.360    0.211   7    0.015  22    0.011  74    0.011 262    0.004 128    0.005 352    0.002   9    0.008 311    0.002 242
DCP14    .701       0.353    0.144  11    0.020  70    0.006  26    0.032 299    0.007  66    0.003 318    0.008 350    0.010 326    0.006 216
DCP15    .800       0.188    0.083  20    0.011  64    0.007  41    0.001 266    0.006  47    0.004 230    0.004  17    0.012 315    0.003 240
DCP16    .900      -0.044    0.031  35    0.006 110    0.004 104    0.008 291    0.009 272    0.008 162    0.007   0    0.010 356    0.005 241
DCP17    .969      -0.043    0.010 223    0.002  67    0.008 180    0.004 180    0.005 199    0.003 112    0.010  23    0.010 330    0.005 199
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                      FORCED  PITCHING  OSCILLATION               AIRFOIL     NLR 1        ACCELERATION TARES

            TUNED HZ      DRIVE HZ      K            MACH NO        DEL.ALPHA    DEL.H          ALPHA.O       TEST POINT   CYCLES ANALYSED
              0.0          23.13          0.116        0.300         5.14          0.0            7.48         12009.4       20

            V             Q             RN           CN(MIN)        CN(MAX)      ALPHA.NMAX     AERO DAMP     TDR          EXT DAMP
             101.6         27019.        0.46E 07    -0.025          1.206        12.50         -0.00112       0.920        0.0
            (333.2)       (564.3)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 7.477     5.140   0    0.247   7    0.051 264    0.003 308    0.012  55    0.013 354    0.020 201    0.006 170    0.006 133
CN                    0.616     0.403 358    0.028  23    0.002   3    0.003 126    0.002   5    0.000 106    0.002 344    0.010 338    0.004 206
CM                   -0.003     0.018 327    0.002 269    0.001 292    0.000  49    0.001 309    0.001 227    0.000  62    0.002 134    0.000  21

DCP 1     .010        4.060     2.718 348    0.158 333    0.100 168    0.129  66    0.084 323    0.014 244    0.022 305    0.021  14    0.015 215
DCP 2     .020        3.261     2.132 351    0.129  23    0.062 342    0.021 223    0.011 300    0.016 198    0.008 334    0.024  33    0.009 244
DCP 3     .030        3.024     1.861 351    0.047   0    0.020 341    0.012 219    0.006 312    0.009 207    0.005  14    0.009  31    0.010 220
DCP 4     .049        2.636     1.528 351    0.093  11    0.030 341    0.011 209    0.003  72    0.003 307    0.009  35    0.020  27    0.004 246
DCP 5     .074        2.295     1.202 352    0.075  15    0.022 336    0.008 209    0.003 349    0.002  16    0.005  16    0.016  20    0.006 186
DCP 6     .099        2.062     1.016 353    0.065  17    0.019 339    0.009 208    0.006 287    0.004 273    0.006 348    0.017  25    0.003 206
DCP 7     .149        1.512     0.768 354    0.050  20    0.007 350    0.010 154    0.008 346    0.006 175    0.010   3    0.015   9    0.008 205
DCP 8     .200        1.243     0.673 357    0.048  16    0.016 337    0.008 148    0.006  26    0.010 208    0.007  11    0.016  22    0.008 194
DCP 9     .250        1.065     0.537 357    0.030   9    0.006 239    0.006 118    0.005  65    0.001  96    0.004  22    0.013 341    0.002 165
DCP10     .300        0.944     0.445 358    0.033  20    0.001 126    0.005  52    0.004 165    0.001  35    0.003  38    0.009 292    0.006 265
DCP11     .399        0.782     0.366   5    0.030  33    0.002 140    0.003   5    0.002 289    0.006  72    0.001 268    0.017 323    0.006 175
DCP12     .501        0.573     0.262   8    0.022  49    0.006 191    0.005 125    0.003  12    0.003  55    0.004 228    0.011 300    0.007 199
DCP13     .600        0.476     0.195  12    0.019  50    0.007 138    0.004 157    0.005  77    0.002  74    0.001 281    0.013 317    0.005 203
DCP14     .701        0.422     0.124  23    0.023  51    0.001 182    0.005  59    0.003 141    0.006 359    0.004  89    0.009 337    0.003 191
DCP15     .800        0.227     0.069  43    0.011  50    0.005  51    0.003 256    0.003 115    0.001 325    0.004 355    0.007 312    0.003 278
DCP16     .900       -0.026     0.029  43    0.001  82    0.005   7    0.006 264    0.002 160    0.001  36    0.007 214    0.009 309    0.004 132
DCP17     .969       -0.049     0.011 100    0.234 273    0.035 149    0.008 135    0.005 302    0.004 12[illegible]    0.008 310    0.015   0    0.003 305
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                      FORCED  PITCHING  OSCILLATION               AIRFOIL     NLR 1        ACCELERATION TARES

            TUNED HZ      DRIVE HZ      K            MACH NO        DEL.ALPHA    DEL.H          ALPHA.O       TEST POINT   CYCLES ANALYSED
              0.0          23.26          0.117        0.300         5.12          0.0            9.99         12009.5       20

            V             Q             RN           CN(MIN)        CN(MAX)      ALPHA.NMAX     AERO DAMP     TDR          EXT DAMP
             101.2         26875.        0.46E 07    -0.095          1.398        15.10         -0.00048       0.390        0.0
            (331.9)       (561.3)
                                                                HARMONIC ANALYSIS
DATA
TYPE       X/C        RES 0     RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA                 9.993     5.121   0    0.266  14    0.062 265    0.012 195    0.032  78    0.037 347    0.031 164    0.013 154    0.007 304
CN                    0.943     0.351  22    0.099 339    0.037 173    0.020  31    0.014 309    0.014 229    0.015 137    0.013  50    0.014 308
CM                   -0.011     0.019 206    0.026  51    0.022 294    0.013 171    0.005  86    0.004  11    0.003 296    0.003 207    0.004 110

DCP 1     .010        4.406     1.172  23    1.153  38    0.619 315    0.396 243    0.315 179    0.208 109    0.113  28    0.056 265    0.078 185
DCP 2     .020        3.521     0.930  29    1.022  45    0.610 320    0.366 236    0.238 166    0.168 102    0.126  48    0.065 355    0.071 302
DCP 3     .030        3.143     0.757  41    0.989  38    0.561 305    0.257 211    0.087 161    0.117 140    0.166  61    0.118 333    0.090 258
DCP 4     .049        3.076     1.076  12    0.383  16    0.135 283    0.076 173    0.048  78    0.034 350    0.015 273    0.010 161    0.004  33
DCP 5     .074        2.612     0.815  15    0.341  16    0.128 275    0.074 163    0.041  53    0.033 324    0.021 216    0.021 133    0.010  16
DCP 6     .099        2.296     0.679  20    0.321  15    0.125 269    0.080 153    0.045  44    0.033 314    0.021 210    0.016 119    0.007 333
DCP 7     .149        1.710     0.553  24    0.267   2    0.116 243    0.062 133    0.036  21    0.020 295    0.005 214    0.012 145    0.004 292
DCP 8     .200        1.450     0.560  23    0.227 339    0.134 211    0.093  96    0.059 357    0.033 277    0.023 204    0.025 120    0.009 347
DCP 9     .250        1.274     0.564  19    0.215 313    0.161 178    0.105  74    0.061 352    0.053 281    0.052 191    0.039 100    0.033  14
DCP10     .300        1.138     0.502  17    0.194 330    0.151 170    0.095  69    0.064 356    0.063 274    0.056 179    0.034  77    0.022   2
DCP11     .399        0.943     0.413  20    0.145 292    0.125 156    0.080  44    0.049 326    0.048 255    0.040 154    0.029  55    0.020 329
DCP12     .501        0.687     0.303  23    0.093 281    0.102 131    0.075  16    0.050 286    0.036 204    0.034 127    0.025  33    0.024 319
DCP13     .600        0.546     0.229  29    0.070 271    0.088 115    0.063 347    0.038 257    0.034 175    0.023  89    0.018  27    0.020 313
DCP14     .701        0.457     0.153  39    0.050 257    0.073 105    0.064 329    0.024 231    0.015 156    0.016  93    0.015 354    0.022 289
DCP15     .800        0.268     0.119  29    0.061 232    0.064  93    0.044 318    0.013 232    0.004 167    0.009 116    0.010  14    0.026 279
DCP16     .900        0.016     0.085   1    0.045 210    0.021  87    0.020 308    0.014 222    0.017 123    0.010   6    0.003 302    0.009 231
DCP17     .969       -0.032     0.036 349    0.026 219    0.019  64    0.012 290    0.006 161    0.004 120    0.008  25    0.005  65    0.008 217
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                        FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1          ACCELERATION TARES

            TUNED HZ       DRIVE HZ     K            MACH NO       DEL.ALPHA     DEL.H        ALPHA.O       TEST POINT   CYCLES ANALYSED
             0.0            23.22        0.117        0.299         5.08          0.0          12.48        12009.6        20

            V              Q            RN           CM(MIN)       CN(MAX)       ALPHA.NMAX   AERO DAMP     TDR          EXT DAMP
             100.8          26732.       0.48E 07    -0.183         1.697         16.66       -0.00108       0.878         0.0
            (330.8)        (558.3)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             12.478      5.064   0    0.239  14    0.016 315    0.052 351    0.039 291    0.071 165    0.025 230    0.016  35    0.013 306
CN                 1.045      0.299  52    0.160  17    0.081 302    0.064 219    0.041 144    0.032  71    0.020 359    0.012  27    0.024 291
CM                -0.025      0.054 199    0.038  93    0.021  45    0.019 347    0.013 281    0.011 210    0.006 139    0.001 102    0.005  76

DCP 1    .010      4.584      0.778 143    1.356  61    0.732  39    0.422 357    0.239 333    0.152 341    0.200 307    0.102 254    0.060 217
DCP 2    .020      3.601      0.606 134    1.171  79    0.497  31    0.259 359    0.167 326    0.085 326    0.149 305    0.106 258    0.098 242
DCP 3    .030      3.302      0.745 135    1.064  69    0.250  25    0.234  39    0.206 340    0.093 319    0.136 308    0.115 255    0.076 233
DCP 4    .044      3.323      0.455  61    0.623  61    0.269   7    0.144 311    0.105 260    0.072 205    0.050 150    0.049  98    0.017   6
DCP 5    .074      2.742      0.414  75    0.560  54    0.232 348    0.116 280    0.066 224    0.049 165    0.029 111    0.036  68    0.015 328
DCP 6    .099      2.448      0.427  80    0.516  48    0.217 336    0.111 265    0.054 236    0.038 161    0.027 118    0.035  81    0.013 344
DCP 7    .144      1.860      0.439  64    0.384  29    0.155 314    0.091 246    0.055 186    0.028 125    0.011  59    0.022  81    0.009 326
DCP 8    .200      1.574      0.461  60    0.344  21    0.169 316    0.136 254    0.096 197    0.062 139    0.034  77    0.033  57    0.019 326
DCP 9    .250      1.365      0.468  53    0.305   8    0.172 305    0.160 241    0.129 168    0.073 111    0.045  70    0.046  41    0.031 316
DCP10    .300      1.229      0.458  50    0.276   1    0.173 300    0.164 234    0.116 165    0.079 115    0.052  61    0.049  36    0.045 334
DCP11    .399      1.041      0.424  48    0.221 351    0.150 294    0.146 229    0.103 163    0.081 107    0.044  54    0.045  48    0.061 341
DCP12    .501      0.747      0.365  41    0.158 331    0.109 273    0.119 203    0.090 129    0.073  74    0.043  16    0.036  13    0.061 303
DCP13    .600      0.637      0.303  40    0.125 309    0.080 241    0.095 182    0.077 106    0.055  41    0.042 350    0.019 349    0.053 275
DCP14    .701      0.542      0.245  38    0.117 287    0.070 220    0.085 155    0.061  82    0.054  16    0.041 316    0.021 258    0.033 240
DCP15    .800      0.345      0.236  21    0.104 269    0.064 218    0.073 143    0.039  66    0.047   9    0.044 293    0.022 232    0.025 198
DCP16    .900      0.071      0.147   6    0.063 264    0.049 215    0.038 136    0.028  65    0.040 354    0.025 265    0.014 197    0.018 208
DCP17    .969     -0.003      0.079 357    0.027 279    0.025 242    0.019 150    0.014  94    0.023 355    0.013 275    0.007 191    0.014 184


                        FORCED  PITCHING  OSCILLATION              AIRFOIL     NLR 1          ACCELERATION TARES

            TUNED HZ       DRIVE HZ     K            MACH NO       DEL.ALPHA     DEL.H        ALPHA.O       TEST POINT   CYCLES ANALYSED
             0.0            23.24        0.118        0.298         5.05          0.0          15.04        12009.7        20

            V              Q            RN           CM(MIN)       CN(MAX)       ALPHA.NMAX   AERO DAMP     TDR          EXT DAMP
             100.6          26660.       0.48E 07    -0.218         1.826         17.62       -0.00164       1.332         0.0
            (330.0)        (556.8)
                                                                 HARMONIC ANALYSIS
DATA
TYPE      X/C      RES 0      RES 1 PHI    RES 2 PHI    RES 3 PHI    RES 4 PHI    RES 5 PHI    RES 6 PHI    RES 7 PHI    RES 8 PHI    RES 9 PHI

ALPHA             15.036      5.048   0    0.224  16    0.022 192    0.027  96    0.082  60    0.106 326    0.040 166    0.039 159    0.014 189
CN                 1.093      0.324  81    0.150  57    0.078   5    0.061 341    0.058 285    0.046 246    0.035 205    0.022 167    0.013 162
CM                -0.043      0.075 198    0.024 142    0.027 121    0.018 106    0.018  62    0.013  27    0.010 353    0.010 314    0.003 286

DCP 1    .010      4.240      1.993 159    0.990 110    0.534 126    0.411 129    0.209 114    0.177 154    0.163 134    0.077 119    0.089 110
DCP 2    .020      3.642      1.592 155    0.717 102    0.400 124    0.225 115    0.138 107    0.108 152    0.138 143    0.109 134    0.138 134
DCP 3    .030      3.167      1.483 149    0.417  98    0.475 138    0.145 114    0.212 132    0.091 117    0.130 133    0.070 106    0.093 134
DCP 4    .044      3.350      0.652 136    0.564 130    0.297  61    0.189  51    0.122  17    0.090 346    0.051 301    0.021 337    0.021  18
DCP 5    .074      2.608      0.688 128    0.454  83    0.205  64    0.127  34    0.087 346    0.055 327    0.045 279    0.019 312    0.015 336
DCP 6    .099      2.452      0.688 121    0.391  70    0.165  55    0.115  21    0.086 327    0.039 299    0.037 265    0.014 303    0.004 339
DCP 7    .144      1.939      0.598  96    0.266  55    0.177  41    0.101   3    0.096 331    0.063 286    0.036 245    0.020 312    0.015 234
DCP 8    .200      1.617      0.550  92    0.282  60    0.203  35    0.121   8    0.127 333    0.082 293    0.050 270    0.034 304    0.013 248
DCP 9    .250      1.448      0.530  82    0.291  49    0.200  15    0.133 356    0.140 316    0.095 284    0.060 249    0.037 252    0.033 224
DCP10    .300      1.267      0.479  76    0.263  46    0.181   6    0.139 352    0.126 308    0.088 279    0.049 252    0.043 246    0.035 228
DCP11    .399      1.103      0.430  69    0.209  40    0.149 355    0.117 347    0.106 299    0.090 279    0.050 243    0.051 230    0.038 228
DCP12    .501      0.871      0.374  57    0.144  24    0.122 330    0.083 325    0.087 276    0.073 247    0.053 218    0.057 196    0.036 183
DCP13    .600      0.715      0.344  48    0.104   3    0.117 318    0.083 298    0.099 259    0.062 226    0.065 200    0.063 167    0.041 146
DCP14    .701      0.608      0.332  39    0.068 329    0.103 299    0.070 284    0.096 239    0.073 200    0.062 170    0.054 130    0.030 109
DCP15    .800      0.417      0.267  23    0.059 317    0.084 293    0.066 281    0.074 225    0.061 187    0.054 155    0.056 101    0.024  77
DCP16    .900      0.136      0.191  11    0.049 333    0.046 282    0.047 266    0.035 199    0.039 168    0.028 128    0.046 100    0.021  17
DCP17    .969      0.023      0.088  12    0.030 348    0.033 288    0.018 256    0.023 219    0.017 161    0.022 137    0.023 109    0.015  51
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                        FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1          ACCELERATION TARES

               TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                0.0         23.27       0.118       0.299       5.04        0.0         17.51      12009.8      20

               V           U           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                100.6       26703.      0.48E 07   -0.214       1.846       17.99      -0.00264     2.151       0.0
               (330.1)     (557.7)
                                                        HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               17.512    5.041   0   0.199   4   0.067 238   0.030 189   0.031 142   0.069 112   0.019 236   0.028  34   0.009  56
CN                   1.090    0.352  96   0.133  33   0.077  91   0.053  67   0.046  55   0.043  40   0.022  32   0.033  28   0.013  44
CM                  -0.057    0.075 206   0.036 237   0.020 196   0.016 197   0.014 186   0.013 182   0.004 169   0.010 180   0.004 166

DCP 1     .010       3.647    2.459 164   0.680 178   0.675 231   0.280 235   0.254 253   0.133 308   0.145 295   0.084 317   0.116 320
DCP 2     .020       3.176    1.924 160   0.475 178   0.416 189   0.194 222   0.145 264   0.127 307   0.141 323   0.131 344   0.114   2
DCP 3     .030       2.780    1.665 153   0.561 206   0.290 180   0.297 220   0.145 268   0.094 260   0.121 302   0.076 337   0.066 344
DCP 4     .049       3.311    0.849 154   0.396 140   0.224 150   0.148 162   0.110 150   0.076 145   0.031 119   0.046 187   0.036 152
DCP 5     .074       2.756    0.830 141   0.267 120   0.157 137   0.101 146   0.084 114   0.038 120   0.025  87   0.027 181   0.028 131
DCP 6     .099       2.416    0.797 129   0.219 113   0.179 123   0.078 111   0.085  99   0.031  83   0.036  82   0.019 143   0.024 114
DCP 7     .149       1.922    0.614 135   0.199 116   0.143 103   0.091 114   0.073  98   0.057  92   0.038  62   0.024 118   0.013 113
DCP 8     .200       1.578    0.599 108   0.270 138   0.177 107   0.149  99   0.113  95   0.082  92   0.037  81   0.055 101   0.023 126
DCP 9     .250       1.435    0.572  99   0.267  97   0.184 100   0.156  80   0.112  93   0.069  73   0.051  86   0.050  64   0.035 107
DCP10     .300       1.291    0.518  91   0.245  88   0.178  97   0.145  80   0.117  85   0.087  77   0.054  76   0.049  76   0.032 105
DCP11     .399       1.115    0.459  82   0.201  77   0.146  85   0.114  73   0.097  74   0.087  72   0.048  67   0.075  67   0.030  84
DCP12     .501       0.901    0.393  69   0.176  57   0.106  62   0.040  43   0.083  46   0.077  43   0.048  39   0.074  30   0.037  61
DCP13     .600       0.746    0.361  58   0.156  45   0.094  42   0.080  19   0.074  25   0.077  15   0.036   6   0.068   9   0.029  33
DCP14     .701       0.636    0.309  46   0.138  37   0.077  12   0.072   7   0.067 357   0.072 355   0.031 336   0.050 344   0.026 351
DCP15     .800       0.463    0.235  31   0.129  29   0.068 357   0.055   6   0.062 341   0.055 337   0.028 294   0.041 325   0.026 316
DCP16     .900       0.184    0.139  25   0.096  11   0.046 354   0.027 347   0.038 330   0.036 320   0.011 307   0.029 339   0.025 293
DCP17     .969       0.041    0.064  30   0.044  26   0.011  17   0.010   0   0.018 326   0.011 339   0.008 305   0.013 356   0.010 304


                        FORCED  PITCHING  OSCILLATION           AIRFOIL    NLR 1          ACCELERATION TARES

               TUNED HZ    DRIVE HZ    K           MACH NO     DEL.ALPHA   DEL.H       ALPHA.O     TEST POINT  CYCLES ANALYSED
                0.0         23.16       0.118       0.298       5.07        0.0         19.95      12009.9      20

               V           W           RN          CN(MIN)     CN(MAX)     ALPHA.NMAX  AERO DAMP   TDR         EXT DAMP
                100.4       26607.      0.48E 07   -0.199       1.589       18.52      -0.00417     3.388       0.0
               (329.3)     (555.7)
                                                        HARMONIC ANALYSIS
DATA
TYPE       X/C       RES 0    RES 1 PHI   RES 2 PHI   RES 3 PHI   RES 4 PHI   RES 5 PHI   RES 6 PHI   RES 7 PHI   RES 8 PHI   RES 9 PHI

ALPHA               19.946    5.365   0   0.215   6   0.059 245   0.012 251   0.013   8   0.031 298   0.030 193   0.002 105   0.008  21
CN                   1.058    0.316 100   0.049 133   0.060 149   0.034 170   0.032 163   0.029 177   0.018 183   0.003  26   0.003 193
CM                  -0.065    0.065 234   0.022 243   0.018 276   0.010 295   0.010 308   0.008 335   0.003 349   0.002 191   0.002 355

DCP 1     .010       2.814    1.655 161   0.579 229   0.222 251   0.228 296   0.115   9   0.036  60   0.053  88   0.046 105   0.022 148
DCP 2     .020       2.480    1.201 161   0.459 232   0.193 260   0.157 305   0.072   0   0.035  58   0.021 103   0.051 113   0.018 235
DCP 3     .030       2.276    0.936 155   0.478 227   0.206 284   0.094 323   0.030  16   0.030  56   0.031 132   0.035 125   0.019 216
DCP 4     .049       2.913    0.846 164   0.140 222   0.243 228   0.059 236   0.066 256   0.014 294   0.015 124   0.046  57   0.043  26
DCP 5     .074       2.433    0.619 145   0.113 254   0.182 222   0.030 196   0.041 228   0.007 134   0.017 152   0.033  56   0.031   5
DCP 6     .099       2.119    0.514 126   0.086 230   0.092 214   0.044 201   0.042 204   0.012 157   0.025 152   0.021  67   0.012  36
DCP 7     .149       1.734    0.412 100   0.100 148   0.085 190   0.060 188   0.030 194   0.014 186   0.012 208   0.009 121   0.012  20
DCP 8     .200       1.471    0.410 139   0.124 155   0.111 178   0.058 210   0.054 211   0.044 235   0.026 241   0.005 284   0.007 329
DCP 9     .250       1.367    0.429 133   0.126 148   0.136 152   0.086 193   0.068 187   0.055 217   0.040 219   0.030 277   0.004 341
DCP10     .300       1.255    0.430  98   0.122 142   0.120 149   0.082 191   0.059 192   0.050 212   0.032 210   0.024 262   0.009 286
DCP11     .399       1.147    0.393  94   0.103 131   0.119 139   0.077 189   0.051 188   0.057 202   0.033 217   0.022 272   0.011 238
DCP12     .501       0.959    0.359  84   0.087 103   0.099 126   0.062 163   0.050 162   0.051 171   0.037 180   0.014 230   0.009 238
DCP13     .600       0.812    0.333  74   0.084  75   0.077 106   0.050 132   0.060 139   0.045 163   0.026 150   0.021 137   0.019 190
DCP14     .701       0.712    0.310  65   0.044  62   0.072  99   0.047 108   0.045 121   0.034 146   0.013 131   0.021  75   0.010 157
DCP15     .800       0.559    0.262  62   0.079  52   0.057  91   0.043  98   0.041 118   0.037 142   0.015 192   0.019  16   0.012 120
DCP16     .900       0.247    0.166  63   0.045  42   0.028  87   0.027  68   0.027  96   0.023 126   0.012 125   0.023   4   0.006 102
DCP17     .969       0.072    0.083  71   0.012  67   0.013  95   0.011  87   0.009 122   0.008 124   0.004 109   0.003 340   0.015 203
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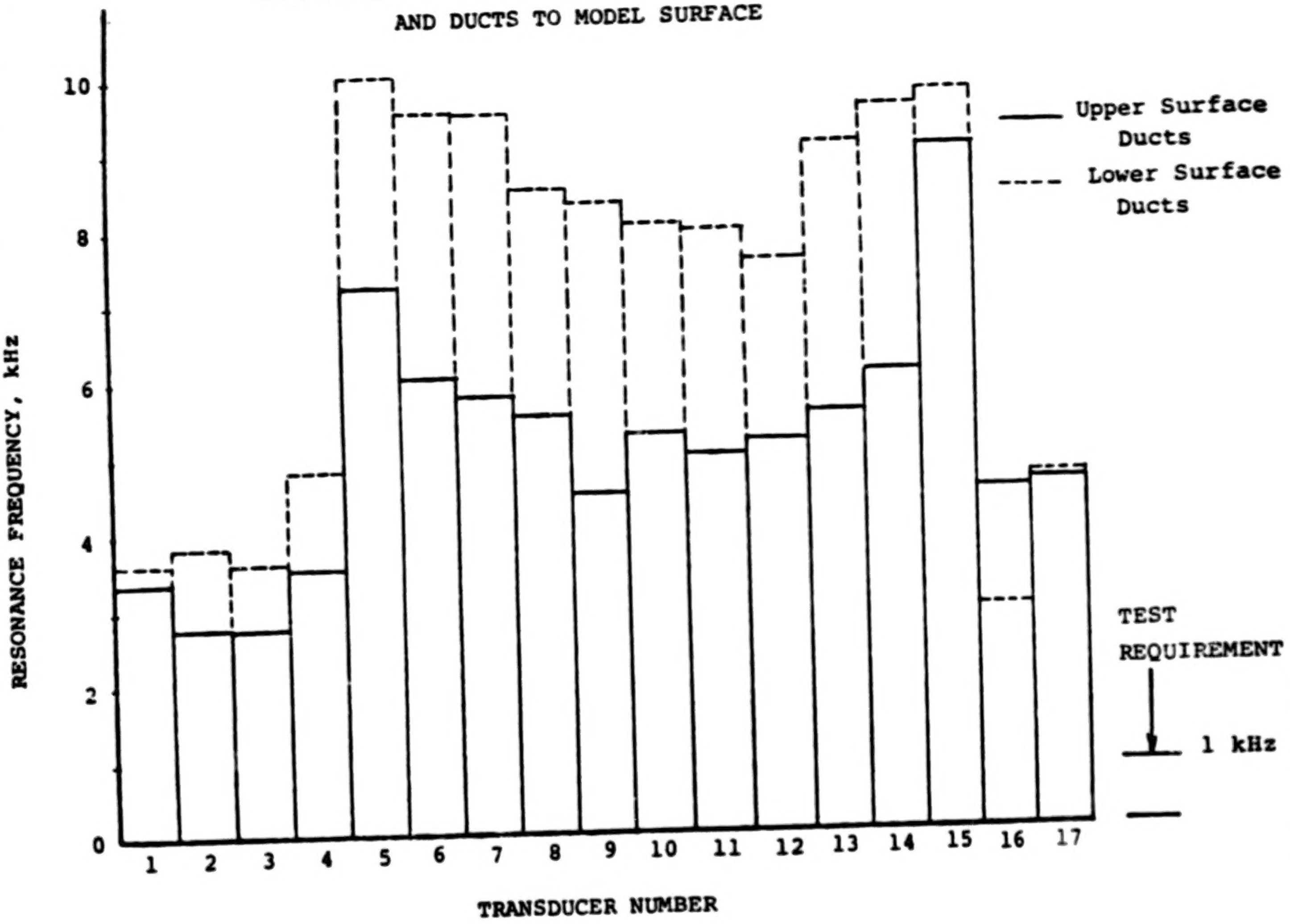
RESONANCE TEST OF PRESSURE TRANSDUCER CAVITY AND DUCTS TO MODEL SURFACE



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16. Abstract

A two-dimensional wind tunnel test was conducted to obtain the quasi-steady and unsteady characteristics of the NLR 7223-62, an advanced airfoil designed for helicopter rotor applications.

Differential pressures were measured at 17 locations along the chord of the airfoil model. The airfoil motion were sinusoidal forced pitch oscillations about the quarter chord at amplitudes varying from 2.5° to 10.0° and at frequencies from 23 Hz to 90 Hz. The quasi-steady tests were conducted at Mach numbers from 0.2 to 0.9, and the oscillatory tests between M = 0.2 and M = 0.7. At quasi-steady conditions a limited number of drag measurements was made with a wake-traversing probe. The results of the test are outlined and discussed in Volume I. A systematic tabulation of test results is presented in Volume II.

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